# Department of Agriculture New South Wales

# ANNUAL REPORT 1977-78

1977-78

NEW SOUTH WALES

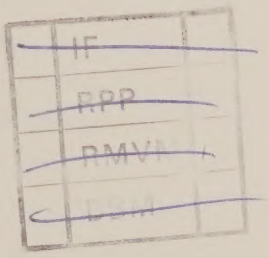
# REPORT

OF THE

# DEPARTMENT OF AGRICULTURE

FOR THE

## Year ended 30 June, 1978



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The Hon. D. DAY, M.L.A.,

Minister for Decentralisation and Development and Minister for Primary Industries, Sydney.

Sir,

I have the honour to present a report reviewing the activities of the Department of Agriculture for the year ended 30th June, 1978.

R. M. WATTS,
Director-General.

The objectives of the New South Wales Department of Agriculture are to safeguard, and improve the productivity of, the agricultural industries of New South Wales; and to encourage the orderly marketing of safe, acceptable produce, with consequent improvement in the prosperity and quality of life of both rural and urban communities.

The main aim of this report is to enable the Minister to table in Parliament a comprehensive record of what the Department did to attain its objectives during the year under review.

This report is also distributed to libraries, industry leaders and others throughout Australia and overseas, usually on an exchange basis. It is not intended for a wide audience, which is catered for by other, more regular, publications.

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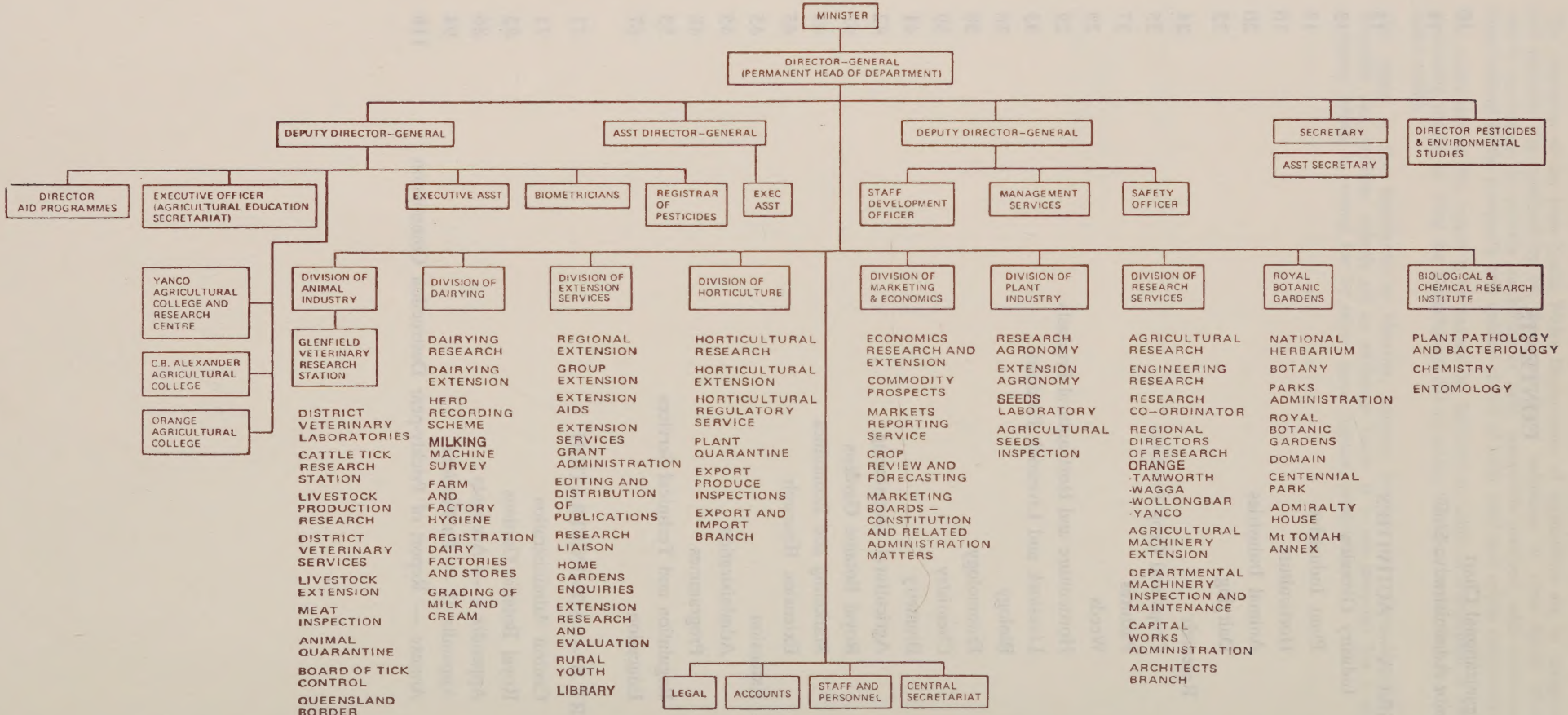
# Department of Agriculture N.S.W.



# SENIOR ADMINISTRATIVE PERSONNEL

## As at 30th June, 1978

| | |
|---|---|
| Minister | Hon. D. DAY, M.L.A. |
| Director-General | R. M. WATTS |
| Deputy Director-General | B. OWEN FRENCH |
| Deputy Director-General | Dr R. B. DUN |
| Assistant Director-General | Dr K. P. SHERIDAN |
| Secretary | J. L. HAGER |
| Assistant Secretary | R. E. JONES |
| Accountant | D. A. SMITH |
| Chiefs of Divisions: | |
| Animal Industry | D. H. MUMFORD |
| Dairying | Dr G. J. SMITH |
| Horticulture | G. R. GREGORY |
| Plant Industry | Dr S. G. GRIMMETT |
| Marketing and Economics | Dr D. E. MACCALLUM |
| Extension Services | J. N. POTTER |
| Research Services | K. E. HUTTON |
| Chief Biometrician | E. A. ROBERTS |
| Director of Pesticides and Environmental Studies | T. H. JOHNS |
| Biological and Chemical Research Institute Management Committee: | |
| Chairman and Director of Chemistry | Dr F. R. HIGGINSON |
| Director of Biology | Dr G. EVANS |
| Director of Entomology | M. CASIMIR |
| Executive Officer | C. J. PARKER |
| Director and Chief Botanist, Royal Botanic Gardens and National Herbarium | Dr. L. A. S. JOHNSON |
| Director, Aid Programmes | J. H. BALLARD |
| Principals, Agricultural Colleges: | |
| C. B. Alexander Agricultural College | G. C. McFARLANE |
| Orange Agricultural College | R. J. NAPIER |
| Yanco Agricultural College | K. W. BANNISTER |

# PART A – ACTIVITIES

## INDUSTRY OVERVIEW

## PLANT INDUSTRIES

### THE SEASON

Autumn/early winter conditions ranged from very wet in northern and central regions to dry in parts of the Riverina. However, in most southern districts autumn/early winter rainfall was adequate to permit winter crop sowings. Winter crops were sown late June/July in Central West and North West Slopes and Plains.

Negligible rain from July to January throughout the State, combined with extremely low winter temperatures and high spring/early summer temperatures, resulted in below average yields from winter crops in most districts and a considerable reduction in area sown to summer crops. Pasture growth was severely restricted.

January rainfall boosted lucerne in inland districts, summer pastures in coastal areas, and summer crop sowing in north western districts. Widespread March flooding in the Hawkesbury and Mid North Coast caused serious loss of stock, crop and pastures. April/May was predominantly dry in all districts and favourable for summer crop harvesting.

From mid-May above-average rain in all districts promoted adequate pasture growth for the winter, but caused considerable delay in sowing winter crops. Significant proportions of late-sown summer crops and cotton have not been harvested with significant loss of yield potential and income due to weather damage.

### WINTER CEREALS

*Crop Estimates for Winter Cereals*

| Crop | 1977-78 | | | | 1976-77 | | | |
|---|---|---|---|---|---|---|---|---|
| | Area ('000 ha) | | Grain Production ('000 t) | Yield t/ha | Area ('000 ha) | | Grain Production ('000 t) | Yield t/ha |
| | Total | For Grain | | | Total | For Grain | | |
| Wheat . . | 3 600 | 3 374 | 3 846 | 1.14 | 3 150 | 3 116 | 5 141 | 1.65 |
| Oats . . | 500 | 298 | 243 | 0.81 | 463 | 250 | 307 | 1.23 |
| Barley . . | 550 | 498 | 444 | 0.89 | 439 | 417 | 571 | 1.36 |
| Ryecorn . . | N.A. | N.A. | N.A. | N.A. | 4 | 3 | 2 | 0.79 |

*Wheat*

The crop harvested was of exceptionally high quality being dry, clean and of protein levels which enabled over fifty per cent of the crop to be classified into premium grades. New varieties played a significant role; Condor, the hard semi-dwarf variety bred at the Wagga Agricultural Research Institute, accounted for over twenty per cent of grain deliveries. The University of Sydney varieties Timgalen and Songlen together accounted for a further twenty-five per cent of deliveries. Despite the very dry spring, semi-dwarf varieties yielded well, again emphasising that recent developments in wheat breeding are making highly significant contributions to the industry.

It was pleasing to note over ninety-seven per cent of farmers adhered to wheat variety recommendations. A new system of recommendations based on deliveries of specified varieties to silos has been instituted for the coming season.

The use of pre-emergent herbicides for the control of annual ryegrass has become a widespread practice in the southern wheat belt. This method of control has increased cereal yields and improved the utilisation of applied nitrogen. However, wild radish is spreading rapidly, associated with the removal of grass weeds and the tolerance that radish exhibits to normal rates of 2,4-D.

*Barley*

Sowings of barley were made on a record area, but production was only the fourth highest. Deliveries of grain to the Barley Marketing Board were only about half of the total production, because large quantities were retained to replenish diminished feed grain reserves. Clipper continued as the most popular barley variety, accounting for fifty-seven per cent of the area sown. The six-rowed variety Abyssinian, useful for grazing and grain, continued in second place but is declining in percentage area.

*Oats*

Production of oats was slightly less than for the previous season and was well below the ten-year average. Oats were particularly affected by the very dry late winter and spring and were grazed heavily to provide fodder for livestock. As for barley, more than the normal quantity of grain was retained on farms. For the twelfth successive year Cooba was the leading oat variety. The newly released variety Blackbutt gained rapidly in popularity, particularly on the Tablelands.

## SUMMER CROPS

*Rice*

The target of 500 000 t of paddy rice set by the Rice Marketing Board for the season was not achieved. The shortfall was 30 000 t and was caused by the unavailability of water to growers in the lower Murray River valley, head sterility from cold nights at flowering, and the wet end to the harvest. High percentage millouts were achieved with low moisture paddy rice as a result of improved milling techniques.

*Grain Sorghum*

Production fell by 40 per cent. Farmers lost interest in preparing for the crop because of the low price forecast for all coarse grains. In mid summer, an upsurge in prices and the onset of late January rains resulted in late sowings of quick maturing hybrids on dryland areas. However, the wet autumn and early April frost delayed the harvest and caused pinched grain. Off-type grain shedding sorghum plants similar to shattercane were discovered for the first time. Steps have been taken to limit their spread and to isolate hybrid seed production blocks.

*Yellow Maize*

Production fell by 30 per cent as a result of a low price forecast, dry spring and summer, and a 15 per cent swing to waxy maize. Coastal growers planted from 30 per cent to 50 per cent of their expected area. The scarcity of seed of the newly released hybrid GH5004 held back plantings. The poor performance of some hybrids and the high costs of planting maize were partly compensated by firm prices.

*Sweet Corn*

Yielded well in all districts with some crops over 20 t/ha. Better yields were attributed to the use of precision planters, better water management, new hybrids, good Heliothis control and suitable harvesting weather.

## OTHER CROPS

*Cotton*

A larger cotton crop, estimated at 31 000 ha, was established under favourable seasonal conditions, and grown with lower levels of nitrogen fertilizer and a low insect pest infestation. In response to the low incidence of heliothis, numbers of spray applications are said to have dropped by 20 to 30 per cent. Much of the crop received heavy rains in January, disrupting crop development and contributing to subsequent nitrogen deficiency. Favourable late season weather induced good quality fibre and high yields. The N.S.W. production potential of 160 000 bales was reduced to possibly 140 000 bales of lowered grades by prolonged wet weather at harvest.

*Tobacco*

Under the influence of marketing quota cuts, the tobacco area contracted to about 850 ha. Spring conditions were favourable but some water quality problems were experienced during summer. Insect control was generally satisfactory and a yield of satisfactory quality, averaging 1 500 kg/ha, was obtained, although 40 t of leaf was lost as a result of early frost.

*Winter Oilseeds*

Increased areas of linseed, rapeseed and safflower were sown in 1977/78 respectively estimated as 19 000, 3000 and 11 000 ha. Late winter and spring growing conditions were unsatisfactory, causing stress to developing and maturing crops. Poor moisture conditions limited linseed production to about 10 000 t, rapeseed to 2000 t and safflower to 6000 t.

*Soybeans*

Responding to an improved world market situation, an expanded soybean crop of 15 500 ha was sown, the vast majority in the central and northern inland river

valleys under irrigation. There was also an increased area rain-grown in northern coastal regions. In inland irrigation areas establishment conditions were excellent, but on the north coast spring and summer drought seriously delayed planting. Prospects of record average yields under irrigation were shattered by prolonged May/June rains which seriously disrupted harvesting and causing substantial weather damage to seed. The major problems were related to late sowing on the coast, a substantially higher incidence of orange bark disease, and crown borer and heliothis damage. Production was revised downward from 33 000 to 27 000 t as a result of adverse weather.

*Sunflower*

Expanded sunflower intentions were disrupted by dry early spring and summer. Rain in January encouraged the final land preparation and sowing of a large area under less than ideal conditions. Diseases in the predominantly late planted crop were of minor importance, but frost at the end of April followed by frequent rain in May/June seriously impaired yield prospects: 25 000 t of seed are expected from 60 000 ha.

*Grain Legumes*

There was increased farmer interest in lupins, which yielded up to 2.0 t/ha. Yields were seriously affected by the dry spring. The demand for seed and grain for pig-feed absorbed any on farm surplus and seed had to be purchased in Western Australia to meet the demand.

Small areas of field peas, mung beans, cowpeas and dry beans were also grown.

*Miscellaneous Crops*

A small, but increased, area of buckwheat was grown primarily for export. Negligible commercial production of peanuts was again restricted to the Wee Waa and north coast areas. Twelve experimental plots of three peanut varieties were grown in the Narromine district to assess the potential of the crop in that area. During the year a number of crops of possible importance attracted the attention of growers and resulted in very limited or pioneering production. These included blue mallee, tea tree, tea and jojoba.

## PASTURES

*Natural Pastures*

The State's 15 m ha of natural pastures were grazed heavily and in many areas remain eaten out.

*Improved Natural Pastures*

These natural pastures, containing adapted pasture legumes, have declined in productivity in recent years due to the withholding of superphosphate. The value and productivity of many of the natural pastures in the central west and north west of the State is centred round natural medics. During the spring, spotted alfalfa aphid combined with drought caused severe damage to these legumes.

*Sown Pastures*

The area of sown pastures, both dryland and irrigated, remained relatively static.

*Lucerne*

Hunter River, the traditional variety, is completely susceptible to both spotted alfalfa aphid and blue green aphid. Some existing stands have been protected by chemical spraying but this is costly and only a short term measure. A range of SAA resistant varieties has been imported from the U.S.A., but their high cost restricted sowings.

A three pronged approach to combating the aphid problem, which was implemented last year, has been continued.

Existing lucerne varieties and imported lucerne varieties are being screened for aphid resistance. Evaluation of natural predators is being made and predators are being bred and strategically released to monitor their usefulness.

Field investigations to determine the efficiency, effectiveness and safety of chemical control measures is also being undertaken.

A range of forage crops (pearl millets, rape, turnips, vetches and forage sorghums) was sown to substitute for lucerne stands damaged by aphid attack.

*Fertilizer Application to Pasture and Lucerne*

Higher livestock commodity prices encouraged farmers to increase their fertilizer usage by 49 per cent over 1976/77.

The need for efficiency in fertilizer usage has been emphasised. Particularly in those northern areas with high phosphorus status soil, there has been a swing to the use of cheaper sulphur-based fertilizers.

*New Pasture Varieties*

Newly available pasture varieties which are achieving farmer acceptance include: Seaton Park, Daliak and Trikkala subterranean clovers (all low in oestrogens), Haifa white clover and Sirosa phalaris.

*Other Pasture Pests*

An outbreak of the Australian plague locust, *Chortoicetes terminifera,* coincided with drought conditions in the Central Western Slopes, Central Plain and north eastern areas of the Western Division from September to late December. Severe damage was inflicted by the locust on irrigated pastures and areas which supported growth during the outbreak. Swarms caused some heavy damage to pasture in the Northern Riverina in autumn. The wingless grasshopper, *Phaulacridium vittatum,* caused severe damage to pasture throughout tableland regions from October to March.

Severe damage was caused by larvae of the pasture cockchafer, *Aphodius tasmaniae,* to improved pastures on the Southern and Central Tablelands and by larvae of the African black beetle, *Heteronychus arator,* on sections of the Coast.

*Fodder Conservation*

Associated with an increase in stocking intensity, the poor 1977/78 season and the lucerne aphids, fodder reserves have declined about 20 per cent. In each of the past three years the amount of hay consumed has been greater than that made. Concurrently there has been a trend to increase the proportion of fodder reserves stored as grain.

### SEEDS

Due to the depressed state of the grazing industries in recent years, the market for seed of most pasture species has been poor. This has led to low prices for seed and a consequent decline in production. The very dry spring of 1977 caused a further dramatic drop in production, and the resulting shortage of seed combined with increased demand caused a sudden rise in prices. Those growers who harvested seed generally did well, but many seed crops were not worth harvesting. The traditional subterranean clover producing areas in southern New South Wales are running into problems with contamination of stands by other varieties.

### IRRIGATION

The drought which prevailed over much of the State stimulated the use of irrigation systems to produce feed as well as the normal range of crops. In an endeavour to relieve the moisture stress on their wheat and barley crops, farmers irrigated a larger area and more frequently than in previous years.

Uncertainties of the amount of water available in the spring greatly affected the area of summer crops and pastures irrigated in the Murray Valley.

Investment to replace or improve labour demanding irrigation systems continued throughout the State. Economies are also being achieved with water through the installation of drainage re-use systems and landforming. The number of centre pivot systems continues to increase, particularly on the sand hills in the South Western Region.

Rising water tables causing salinity problems continue to lower production in the Murray Valley and more recently in the Berriquin district.

## HORTICULTURE

The abnormally dry conditions throughout most of the State during the first six months created problems and affected most fruit crops. Widespread rains during January provided some relief although this was offset by near-record floods in the Hawkesbury Valley and extensive damage to tropical fruits on the North Coast.

### CITRUS

Coastal crops were reduced by drought and flood losses. Inland crops were greater especially in the M.I.A. where a record total crop was harvested.

Production of all main spring and summer citrus crops for 1977/78 was 213 000 t which was 11 620 t more than the previous year.

The area planted to citrus in the State declined by 424 ha to 11 719 ha, the main losses being Valencias and navals in coastal districts.

**Production and Planted Areas of Citrus 1977/78**

| | Production 1977/78 tonnes | Planted Area 1977 | |
|---|---|---|---|
| | | Bearing ha | Total ha |
| Navels | 56 380 | 3 369 | 3 491 |
| Valencias | 123 750 | 5 259 | 5 984 |
| Common oranges | 250 | 38 | 41 |
| Lemons and limes | 17 190 | 985 | 1 118 |
| Mandarins and hybrids | 6 050 | 563 | 599 |
| Grapefruit | 9 150 | 335 | 464 |
| Sevilles and other | 330 | 21 | 22 |
| All citrus | 213 100 | 10 570 | 11 719 |

There was a strong demand for Valencias and navels for juice processing which helped to maintain market prices. Competition led to processors paying up to $110 per tonne for Valencias. The F.I.S.C.C. country prices were $76 for Valencias and $63 for navels but an agreement was reached to pay $10 and $6 respectively per tonne above those rates. Exports from the Murray areas were reduced by the light crops of Ellendales and rind breakdown of oranges owing to wet weather.

The Industries Assistance Commission continued hearings of submissions made by all interested organizations on the problem of cheap imported juice. The final report has not been made to the Australian Government but the industry is concerned that the interim *ad valorem* duty of 65 per cent will be phased out over a short period.

Citrus red mite, *Panonychus citri,* has been recorded throughout the County of Northumberland and in parts of the County of Cumberland. White wax scale, *Gascardia destructor,* has increased in coastal orchards over the last few years while red scale, *Aonidiella aurantii,* is still the major pest of inland districts.

## GRAPES

The dry weather conditions experienced during the late winter and spring were followed by relatively good growing conditions with comparatively few pest and disease problems although some vines in the Hunter Valley suffered from moisture stress with consequent reduction in crop potential.

The season was generally early with the harvesting of table grapes at Orchard Hills, Bulga, Menindee and on the lower Murray commencing in late December.

Heavy rains in late January caused splitting and bunch rots with significant damage to some Shiraz crops particularly in the Upper Hunter where wet conditions complicated harvesting operations, although subsequent dry weather minimised overall losses.

In most areas weather conditions for harvesting and for drying were ideal with vintage earlier than usual and dried vine fruit quality being exceptionally good.

*Production*

| **Wine** | |
|---|---|
| Hunter Valley | 16 729 tonnes |
| M.I.A., etc. | 70 848 tonnes |
| Mudgee (estimated) | 1 400 tonnes |
| Mid Murray, Barooga, Corowa | 2 940 tonnes |
| Lower Murray | 14 524 tonnes |
| Other (estimated) | 300 tonnes |
| | 106 741 tonnes |

| **Dried** | |
|---|---|
| Sultanas | 10 552 tonnes |
| Sultanas — natural | 2 tonnes |
| Raisins | 1 105 tonnes |
| Currants | 244 tonnes |
| Shiraz | 107 tonnes |
| | 12 000 tonnes |

The red grape surplus of 11 500 t was converted to spirit for the Wine Grapes Marketing Board with the cost of processing being borne by a Government Guaranteed Loan from the Rural Bank. As the surplus of red wine grapes was not a seasonal one a similar problem is expected to occur next year.

While the area planted to grapevines increased by 295 ha to 15 265 ha Shiraz plantings decreased and significant areas of uneconomic grapevines in the Hunter Valley have been either removed, abandoned or put under a minimum maintenance programme.

## POME FRUITS

Adverse seasonal conditions resulted in a reduction in fruit size, poor colour development and sunburn. Dry weather favoured the development of codling moth, *Cydia pomonella,* while gale force winds caused a considerable quantity of fruit to fall from apple trees in the Orange district and at Batlow where the losses were estimated at 1 400 t although much of this fruit was processed.

Despite the 1977/78 apple crop being only 77 000 t as compared to 105 000 t in 1976/77 many growers were disappointed with the price received for early apples which met heavy competition from controlled atmosphere stored fruits from the previous season. Prices rose once these fruits were cleared and subsequent returns were mostly satisfactory.

As expected the pear crop was heavier than the previous season's with production for 1977/78 being estimated at 20 000 tonnes as compared to 7 000 t for 1976/77.

Only a small proportion of New South Wales apples and pears are exported. However, the 1 470 t of apples and 1 430 t of pears exported this year was significantly more than that exported in 1976/77.

After a continuing decline over the last 8-9 years there were 5 266 ha planted to apples and 912 ha planted to pears at 31/12/78 with 92 per cent of both being of bearing age.

Despite the reduction in area planted to pome fruit the production of apples is expected to increase as the result of improved efficiency.

In recognition of the need for continuing efficiency in the production of pome fruit the Division of Horticulture has assisted in various area including improved market reporting, the collection and dissemination of cool store figures and analysis of costs of production/marketing.

A local consensus approach in one of the major production districts indicated that it now costs $5 to produce and sell a fancy grade carton of apples and $5.37 for pears in the Sydney wholesale markets.

## STONE AND BERRY FRUITS

*Cherries*

Despite severe drought at Young the State cherry crop of approximately 5 000 t was almost a record. Also the 2 900 t crop at Young approached the district record.

Growers at Orange had a successful season with minimum weather or disease losses. Prices were lower than 1976/77 with a weak demand for small fruit.

*Prunes*

Prunes blossomed under dry conditions with good initial prospects. Drought at Young caused a heavy shedding. M.I.A. trees commenced the season in poor condition possibly due to previous waterlogging damage and shed heavily. January rain caused some fruit cracking. The harvest was one of the earliest and shortest. The M.I.A. crop of 1 568 t and Young crop of 474 t gave a total crop of 2 042 t dry.

The Young crop was the second lowest recorded.

*Peaches and Nectarines*

Dessert peaches and nectarines sold well, particularly early varieties. Hail during spring reduced potential. Peach production totalled 10 000 t and nectarines 1 250 t.

Canning peach crops of 12 520 t were below estimates despite a minimum of pest and disease and a reduction of sizes to 6.3 cm.

*Apricots*

The canning apricot crop of 2 124 t was well below normal. Medium crops of dessert apricots were of good quality and realised excellent prices. Hail damaged crops at Kurrajong late in the season.

*Plums*

The 1 700 t crop of Japanese Plums was below average having been reduced by hail. Good prices were obtained for European plums which totalled 1 500 t.

*Strawberries*

Strawberry crops were well below average and prices disappointing. Heavy losses of new runners occurred in coastal districts following January heatwaves.

Total crop areas declined by 44 ha to 7 722 ha over the year, despite heavy plantings of dessert peaches and nectarines. Berry fruits and Chinese gooseberries continued to expand.

## TROPICAL FRUITS

*Bananas*

Storm and flood damage in both Queensland and New South Wales during February and May, 1977 was followed by exceptionally dry weather. Low production and high prices resulted.

The area planted to bananas in New South Wales has steadily declined since 12 138 ha were recorded in 1960. The downward trend was checked this year with a net increase of 89 ha to give a total of 6 582 ha.

Bunchy Top increased during the year to 2 354 infected plants, the highest incidence since 1958/59. This was largely due to an increased incidence of Bunchy Top in the South Tweed and Brunswick areas which were previously lightly infected.

Increases in the cost of operating the co-operative control scheme (now $135,000 per year) have necessitated three major changes:—

- levies being collected on a per hectare rather than production basis;
- infected plantations being inspected at six weekly intervals rather than three weekly;
- chronically infected plantations, or part plantations, being purchased and destroyed.

*Avocadoes*

The area planted to avocadoes has now increased to over 450 ha. The demand for grafted trees exceeds the supply therefore further plantings are being restricted.

Monolepta beetles *(Monolepta australis)* swarmed much earlier than usual (July) and have continued to swarm throughout the year.

*Nuts*

The nut industry has continued to develop with approximately 800 ha planted to pecans in the Moree district and 700 ha planted to macadamias in the Lismore district where a modern processing factory has now been erected. Interest is also being shown in the production of almonds, walnuts, chestnuts, pistachios and filberts.

## VEGETABLES

Seasonal conditions were particularly dry during the spring and early summer months and were reflected in a plentiful supply to the markets with consequent low prices. Heavy rains in late January and subsequent rains, reduced supply and caused prices to increase for the balance of the year.

The dry conditions experienced during the year provided ideal conditions for the development of the potato moth, *Phthorimaea operculella,* and the cabbage moth,

*Plutella xylostella*, causing substantial damage to potato and cole crops. The sciarid fly, *Lycoriella agarici*, was responsible for yield losses of up to 25 per cent in some mushroom crops.

*Asparagus*

Production again declined because of flooding at Gundagai and the general shortage of harvest labour. For 1976/77 the bearing area of 1 195 ha produced 3 343 000 kg. Substantial quantities of canned asparagus were imported from overseas.

*Green Beans*

Plantings were estimated to be about 10 per cent less than last year when 1 668 ha produced 4 936 kg (fresh market crops 1 045 ha and 2 476 276 kg; processing crops 623 ha and 2 460 412 kg). A substantial proportion of the fresh market crop was mechanically harvested.

*Cole Crops*

Plantings of cabbage and cauliflowers were normal but floods in the Hawkesbury Valley destroyed the autumn 1978 plantings. In 1976/77 5.534 million (461 121 dozen) cabbages were produced from 652 ha. The cauliflower crop totalled 5.006 million (417 134 dozen) from an area of 683 ha.

*Cucurbits*

Production of all types was greater than normal. Rockmelon quality was the best for many years and coincided with the introduction of a grade standard largely based on maturity.

*Onions*

Plantings were estimated to be similar to last year when 1 173 ha produced 25 330 t. Returns to farmers were uneconomic for several months.

*Potatoes*

Plantings declined in tableland districts because of dry weather but increased significantly at Finley and Coleambally. For 1976/77 plantings were 8 400 ha and production 111 861 t. A few centre pivot irrigation systems were used for the first time. Prices were low for much of the year because of heavy supplies from Victoria and South Australia.

*Tomatoes*

Production from fresh market crops was similar to 1976/77 when 1 171 ha produced 1 494 560 half cartons. The processing crop was estimated to produce 39 000 t from a harvested area of 1 183 ha.

*Other Vegetable Crops*

Production of lettuce, carrots, garlic and broccoli increased slightly while pea production declined due to dry weather and frost damage.

# ANIMAL INDUSTRIES

## SHEEP AND WOOL

Poor seasonal conditions and reduced lamb marking percentages (69.3) during 1977 resulted in a four per cent decrease in sheep numbers to 47.8 million. Similarly a large percentage of the wool clip was drought affected with reduced weight, finer in fibre and with a high dust contamination. However, the overall wool cut per head was the same at 4.2 kg as for 1976/77. The State's total wool production was 202.2 million kg. Improved wool weights and lambing percentages occurred in 1978 due to generally improved seasonal conditions for the first six months.

Throughout the year there was a strong demand for all classes of sheep, and values generally increased. The Middle East live sheep trade put a floor in the market for store sheep providing a stimulating effect on prices generally. New South Wales shipped about 750 000 live sheep to the Middle East during 1977/78. Sheepmeats on the local and export scene have been in strong demand. Sheep and lamb slaughtering for 11 months until the end of May, 1978 totalled 6.6 million, this being about the same as for 1976/77.

The stability in wool prices and the good prices received for stock has meant an increased measure of profitability for sheep enterprises. With favourable seasonal conditions sheep numbers and hence sheep and wool production generally should stabilise and start to show increases.

A high proportion of capital improvements such as sheep yards, shearing sheds, dips and fencing on New South Wales properties are very old, of poor design and construction and in a poor state of repair. The sheep recession of the early 70's caused a deterioration of these facilities and little money was invested in these improvements for many years. However, with the recent upturn in the profitability of all forms of sheep and wool production, producers are now re-investing in the maintenance and replacement of their capital improvements.

Australia imported about 8.5 million kg of carpet wool worth $21.5 million during 1976/77. These imports were necessary because no carpet wool was then produced in Australia. Carpet wool sheep have recently become available from New Zealand, however, and this industry is now becoming established in New South Wales. Although it is still in the infant stage, this new industry is rapidly expanding with 13 000 ewes being joined to carpet wool rams during the autumn of 1978. Predictions for future demand and price structures are such that carpet wool production will become an economically viable alternative to traditional sheep and wool production.

The main problems facing the industry were the sheep blowfly, the devastation of lucerne stands by aphids, and poor reproductive performance in 1977 due to seasonal conditions, subterranean clover induced infertility and lamb losses from predation by feral pigs.

## BEEF CATTLE

The beef recession and dry seasons created a pessimistic atmosphere in 1977/78 until higher saleyard prices and abundant rain stimulated considerable optimism in the autumn.

The beef recession was caused by the slower growth of purchasing power, protection for local beef industries, and currency revaluation which decreased demand for imported beef in affluent countries and led to low saleyard prices in Australia. At the same time, lower beef prices stimulated demand for imported beef in less affluent countries and in countries with production problems. These factors and the high cattle numbers in Australia led to the frustration of record high levels of slaughtering, production and export but low prices. Clearly, the industry was paying for local oversupply in the face of discriminating demand from abroad. Within Australia overall economic growth caused increased costs for labour, materials and services and raised expectations as to living standards.

The marketing dilemma, together with the cost-price squeeze, resulted in average net annual earnings for specialist beef producers of $5 000; 24 per cent receiving incomes greater than $10 000, but 34 per cent having negative incomes in Australia. In these circumstances, profitability could only be maintained through increased productivity, i.e., a higher ratio of output to input, or through greater demand and better prices.

Producers tried to meet the challenge by deferring expenditure mainly on labour, fertilisers and maintenance. Further relief has been sought through technological changes, direct marketing procedures, on-farm alterations to property size, enterprise type, equipment, allocation of financial resources and off-farm employment, investments, leasing and property disposal.

Short-term financial assistance for beef producers has been made available in the form of beef industry loans, carry-on loans, household support and beef industry incentive payments. Long-term stabilisation measures have been discussed but no concensus has been reached in the absence of a carcase classification system. However, implementation of a national scheme is to be expedited. Political changes have been implemented in the following areas: income equalisation deposits; investment allowances; currency devaluation; National Rural Bank; Prices Justification Tribunal enquiry into pricing structure of beef industry; reconstituted Australian Meat and Livestock Corporation; new Meat Industry Authority in N.S.W.

In the autumn, Japanese and American quota increases coincided with periods of heavy rain. The industry situation changed dramatically. Saleyard prices rose to previous boom levels in money terms, if not in real terms, due to the rain-induced reduction of saleyard numbers and greater demand. The subsequent rise in retail prices caused considerable consternation.

Continued progress in the eradication of brucellosis indicates that, provided adequate funds are available, N.S.W. should be provisionally free by 1984. This is the target date of the National Brucellosis Eradication Campaign.

## PIGS

High capital and production costs caused a 6.6 per cent drop in sow numbers, but pigmeat production increased. Preliminary figures indicate that the State's pig population fell by 4.6 per cent from 760 394 in 1977 to 725 092 in 1978. To the 11 months ending May 1978 pigmeat production was approximately 11 per cent greater than that of the corresponding period in the previous year.

This rise in pigmeat production can be related to the increased numbers of pigs being forwarded for slaughter by producers who are reducing sow numbers or leaving the industry altogether. To the 10 months ending April 1978 the New South Wales pig industry had contributed $58.7 million to rural income.

Carcases were manually classified at two abattoirs and at one, 14 post-mortem conditions were recorded and distributed to producers.

Pigmeat prices were relatively stable during 1977/78 except for the usual seasonal fluctuations over the Christmas period. Profit margins remained relatively stable even though grain and protein meal prices were high. The high costs of buildings, labour and feed deterred most prospective newcomers from entering the industry.

During 1977 per capita consumption of pigmeats rose by 1.9 kg to 13.5 kg per head. This rise is partly attributed to increased production, reduced exports and a decrease in the price difference between pork and red meats. A promotion campaign held in conjunction with the introduction of "Superpork" to retail outlets is likely to have influenced consumer preferences for pigmeat.

## POULTRY

*Egg Production*

The trend over recent years for a number of producers to leave the industry tapered off. Prices for hen quotas increased from $7.50 to $10.00 per head due to reduced numbers offered for sale.

The effectiveness of the hen quota system increased during the year despite the disruptive activities of a small group of producers who frustrated its proper implementation.

Despite more rigid enforcement of quotas a significant decline in egg production did not eventuate due to better utilisation of cages and better management.

Producers each with quotas for more than 5 000 hens expressed concern that only they should be subjected to cuts in quota to reduce total production.

The price of ready mixed layer rations increased by about $9.00 per tonne, mainly due to increase in the costs of grains.

During the year there was an increase in the trend towards the purchase of started pullets, the force moulting of laying hens, and the practice of block de-beaking.

*Poultry Meat Production*

Production of meat chickens in the State continued to show a steady increase, reaching about 67 million in 1977/78. Prices were virtually the same as last year.

The number of batches of chickens placed in sheds during the past 12 months increased with some producers handling as many as five. Higher production resulted from greater throughput rather than an increase in shedding.

The Chicken Meat Industry Act (1977) was proclaimed. This Act is designed to control contracts between growers and processors.

The average fee paid to producers by processors was 17.66c per bird. The fee will be reviewed by the Chicken Meat Industry Committee.

Demand for turkeys and ducks continued to be high. The duck market is undersupplied. A substantial increase in the supply and demand for pheasants and quail occurred during the year.

## HONEY

Honey production has generally been disappointing, with most beekeepers having to migrate hives over large distances in an effort to get a reasonable crop. This has placed economic stress on most commercial beekeepers, and has led to some of them diversifying. A number of beekeepers went into producing queen bees for export markets; some are interested in producing pollen for human consumption and export markets. Most honey produced was of dark grades.

Diseases have caused the industry some problems and have resulted in restrictions being placed on the interstate movement of bees, honey and appliances.

# DAIRYING

## SEASONAL CONDITIONS

Conditions for dairying during the year were most unfavourable with dry weather prevailing throughout most of the year, followed by serious flooding towards the end of the production season. In the Taree district many farmers were seriously affected by the worst flood this century and will be out of production until the coming spring.

The lucerne aphid has added to farmers' problems and increased his production costs.

The unfavourable weather conditions were mainly responsible for the decrease in milk production and as a result the manufacturing sector suffered accordingly, with this in turn affecting employment in district factories.

*Farm Scene*

Farmer numbers continued to decline but at a slower rate than last year and at March 31, 1978 there were 4 287 registered farmers as compared to 4 400 last year; amounting to a 2.5 per cent decrease.

*Factory Scene*

Rationalisation has continued. Two South Coast factories amalgamated and a further two factories combined with a metropolitan manufacturer.

Non-cheddar cheese manufacturers continued to transfer their city-based operations to country districts in order to ensure a continuous milk supply. One such operator expanded his operation by building a new cheese complex on the Mid Coast.

New South Wales manufacturers have been affected by a fall in throughput and those locked into the manufacture of prescribed products, under the Dairy Industry Marketing Arrangements, have experienced difficulty in remaining viable because of increasing overheads and declining supply.

Managements are endeavouring to increase production of manufacture milk by offering producers various incentive schemes.

Many factories are now looking towards the manufacture of other products which yield higher returns from the market place and which are outside present levy arrangements.

*Factory Development*

One New South Wales factory invested $1 million to expand into the manufacture of long life dairy products, using the latest Ultra High Temperature (U.H.T.) equipment. Commercial production of U.H.T. milk for export and dairy custard and fruit juice for the local market commenced early in the new year. On present indications U.H.T. products appear to be a potential growth area.

During the year a second Camembert manufacturer entered the market. The range of white mould ripened cheese was further expanded by the entry of Brie to the local market. This should further reduce the dependence on imports for these cheese types.

## PRODUCTION

*Milk*

Milk and cream production continued to decline. In excess of 60 per cent of production was utilised by the Dairy Industry Authority. Production levels for the last five years are as follows:—

*** N.S.W. Milk Production ('000,000 litres)**

| | Total | D.I.A. Milk | Manufacturer Milk |
|---|---|---|---|
| 1973/74 | 1069 | 601 | 468 |
| 1974/75 | 958 | 552 | 406 |
| 1975/76 | 980 | 552 | 428 |
| 1976/77 | 943 | 569 | 374 |
| 1977/78 | 890 | 547 | 343 |

* A.B.S. Statistics

*Butter*

Butter production declined markedly from 6 800 t to 4 000 t. The industry is moving fairly quickly out of butter production and into other dairy products which

yield better returns from the market place. Consequently the major proportion of butter consumed in New South Wales is now imported from Victoria and Tasmania.

Interstate butter in the past has been printed into consumer packs in Sydney but following the acquisition of the Sydney plant by a Victorian Co-operative, interstate butter is now printed in Victoria.

*Cheese*

Cheddar cheese production, despite relatively strong market demand, declined by 11 per cent from 7 250 t to 6 450 t. The largest New South Wales cheddar manufacturer negotiated with interstate manufacturers to have a production shortfall made to specification under licence.

Processed cheese production increased by 15.8 per cent to 1 977 t. Most of the increase was in the form of sandwich slices which have enjoyed a 100 per cent sales increase. Most of the cheese for processing originates from interstate factories while a small amount comes from overseas.

One company has, for the first time in New South Wales, commenced production of flavoured processed cheese spreads which are now marketed through a major supermarket chain.

Non-cheddar varieties of cheese accounted for 4 716 t (approximately 42 per cent of cheese production as compared to 39 per cent last year). Increases were evident in Mozzarella, Pizza and Fetta varieties, but limited milk supplies restricted further growth. Production of cottage type cheese increased from 1 600 t to 2 000 t — a growth of 25 per cent.

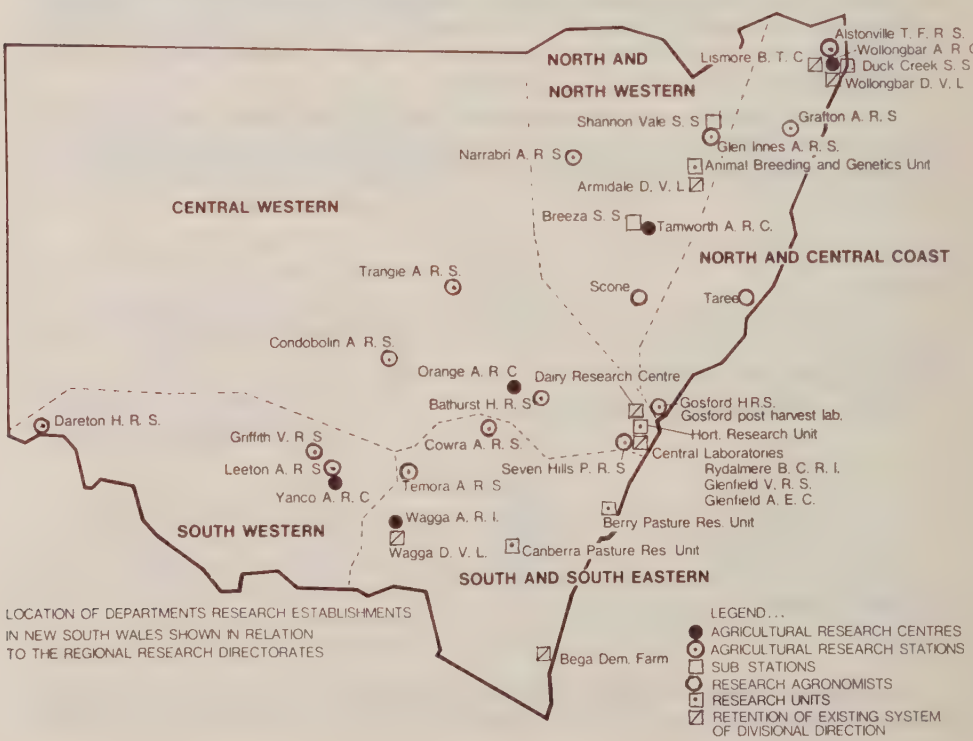
*Cultured Products*

Production of cultured buttermilk and sour cream remained steady during 1977/78. Yoghurt production, however, reached 13.8 million litres reflecting a growth of 37 per cent. In addition, frozen yoghurt manufacture rose steeply from 77 t to 830 t.

# RESEARCH

## RESEARCH ADMINISTRATION

New South Wales is divided into 5 regions for the administration of research. The regions and the research units based in them are shown in Figure 1. The Regional Veterinary Laboratories and the central laboratories at Rydalmere are not included in a regional directorate nor are the Veterinary Research Station, Glenfield, the Dairy Research Centre, Richmond or the National Herbarium.



Each region is administered by a Regional Director of Research. In addition, a Director of Research is located at Trangie and Supervisors of Research at Glen Innes, Grafton and Condobolin Research Stations.

To meet State responsibilities, research is co-ordinated by research directors located with the Divisions in Sydney. At executive level, the Assistant Director-General is responsible for the overall management and control of the Department's research activities.

### SUMMARY OF RESEARCH STAFF

**Numbers of Staff Engaged in Research or Directly Supporting Research Activities**

| | Research | Technical Support | Managerial, Clerical and General Support | Total |
|---|---|---|---|---|
| North and Central Coast Directorate * | 56 | 76 | 127 | 259 |
| North and North Western Directorate * | 47 | 69 | 95 | 211 |
| Central Western Directorate | 43 | 51 | 110 | 204 |
| South and South Eastern Directorate * | 37 | 48 | 60 | 145 |
| South Western Directorate | 29 | 27 | 91 | 147 |
| Glenfield Research Units ** | 39 | 91 | 52 | 182 |
| Biological and Chemical Research Institute, Rydalmere | 69 | 69 | 52 | 190 |
| National Herbarium | 14 | 11 | 6 | 31 |
| Dairy Research Centre, Richmond | 10 | 13 | 6 | 21 |
| Head Office *** | 43 | 11 | 31 | 85 |
| Total | 387 | 466 | 630 | 1 483 |

* Includes staff at Regional Veterinary Laboratory.

** Includes Veterinary Research Station, Noxious and Feral Animals Unit, Drought Research Unit and Agricultural Engineering Centre.

*** Includes staff in the Executive, Divisional Offices in Sydney, Biometrical Branch and officers based with CSIRO units in Sydney.

# CROPS AND CROP PRODUCTS

## WINTER CEREALS

*Bread Wheat*

Inadequate rain in 1978 resulted in moisture stress for winter cereals over most of New South Wales. However, the reputation of Condor, Egret, Kite and Teal was enhanced under the conditions. Condor and Egret increased rapidly in popularity in southern N.S.W., Kite was the highest yielding commercial wheat in northern N.S.W. and Queensland, and Teal increased in popularity in parts of southern N.S.W. For the first time, a number of farmers in southern N.S.W. obtained yields in excess of 7 t/ha with irrigated Egret. The low rainfall and consequent relative absence of *Septoria tritici* made these yields feasible. However, the absence of *Septoria tritici* adversely affected some breeding programmes as segregating lines could not be selected for tolerance or resistance against this disease.

In southern areas, lines of winter hybrid wheat yielded very well. The most promising lines were C.S. P44, two backcrosses of Kite, and Teal backcrosses with rust resistance.

For the first time a reciprocal centrometric translocation between rye chromosome 2R and wheat chromosome 2B has been isolated. Lines containing these translocations will be tested for their reaction to *Septoria tritici*.

In northern N.S.W. several sources of frost resistance, both before and after ear emergence, are available. However, the genetic mechanisms controlling the resistance at these two stages are independent, requiring a two-stage selection procedure. Promising lines from early sown yield trials at two frost liable sites were selected and will be further investigated. The construction of a radiation chamber at Tamworth will speed the selection progress.

Agronomic investigations involving reduced cultivation and direct drilling continued. In the southern wheat belt, the reduced cultivation technique was extended onto large commercial sized blocks. Direct drilling on the Southern Tablelands showed that there were varietal differences; the more competitive cultivars, such as Egret, performed better than Condor.

In the irrigation areas, wheat sod-seeded into rice stubble yielded extremely well.

In the Central West, research at Condobolin showed that when pasture areas are to be cropped, a long fallow produces higher grain yields. However, the erosion hazard has to be considered.

*Durum Wheat*

A new variety, Durati, was released. It yields 11 per cent more than Duramba. Current advanced lines have yielded even more than Durati.

*Barley*

The line B6513 performed well in grain trials and WW B18 in grazing and grain trials. Results of yield and quality data for B6513 and Cutter are being prepared for possible registration of these varieties in 1978.

*Oats*

Four advanced crossbreds with wide adaptability will be tested on a Statewide basis in 1978.

## SUMMER CEREALS

*Rice*

Severe cold snaps in late January and February increased sterility in rice crops. The new selection YR 73 was worst affected. The YR 303D lines performed well in quality evaluation trials and seed increase areas.

Early flooded drill sown rice was shown to have application on low fertility sites where growers do not wish to sow by air.

*Sorghum*

Sorghum grown on the North West Slopes responded to phosphorous at lower levels of soil phosphorous than wheat but responded well to applied nitrogen fertilizer.

*Maize*

The new hybrid GH 5008 yielded well compared to other varieties under dry and late sown conditions.

## FIBRES AND OIL CROPS

*Cotton*

In the cotton breeding programme at Narrabri, several selections in trials yielded more than 1 000 kg of lint/hectare and a low percentage of plants were infected with Verticillium wilt.

Work to quantify the effect of water and nitrogen on the growth, development, quality and yield of cotton has reached the stage of economic analysis of the data to determine how to maximise farm returns.

Measurement of oxygen diffusion rates in irrigated soils showed that poor aeration was quite common. It could limit root growth and nutrient uptake, and promote denitrification.

*Rapeseed*

Progress was made at Wagga in selecting for blackleg resistant rapeseed plants, particularly within *Brassica napus* lines. Some are low in both erucic acid and glucosinolate and are potential varieties for release in 1980. Yellow seeded, low erucic lines were found in *Brassica campestris* rows and will be used as parents in the breeding programme.

Yields of the *Brassica campestris* variety Span exceeded 1 100 kg/ha under the driest seasonal conditions recorded in southern areas. The five year average yield of Span is 1 760 kg/ha.

*Soybeans*

At Narrabri, the released varieties Dodds and Forrest were seed increased. The two varieties have yielded about 4 000 kg/ha.

Under good conditions, the new variety Williams was outstanding in the southern irrigation areas; in less favourable conditions, Calland was superior. At Trangie,

the varieties McDare 27, McDare 146, Hardoo 52, Amber 131, and D62-7816 performed well in relation to commercial varieties. Tolerance to delayed harvest weathering, important on the North Coast, was found to be significantly higher in P25 than in currently used commercial varieties.

Plant density studies have shown that the soybean plant compensates well for variations in plant arrangement. However, plant densities of less than 150 000/ha or greater than 500 000/ha depress yields.

Indeterminate soybeans were very responsive to irrigation frequency during their flowering period. Seed yield was also substantially reduced where plants were well watered during their flowering period but stressed during pod filling.

*Sunflowers*

Nitrogenous fertilizers depressed seed oil content of sunflowers but increased oil yield per unit area when the surface soil contained less than 6 ppm N. On the Southern Tablelands, economic yields were obtained from sunflower crops grown through three of the driest spring months ever recorded by planting early.

*Safflower*

At Trangie, maximum safflower yield (2.46 t/ha) was obtained from a mid May sowing, a month earlier than the optimum yield last year, probably because of the dry and mild season. Crops sown six months apart flowered within six weeks of each other confirming safflower's strong photoperiodic response.

### GRAIN LEGUMES

*Chickpeas*

At Wagga, variety trial results and F2 selections indicated that sufficient flexibility is present within the height/maturity relationship to allow selection of tall early chickpeas. Three introductions, CPI 56296-b and two from ICRISAT, yielded well in recent trials. The F2 stage of a breeding programme was successfully completed with 207 plants being selected for further evaluation in the F3 generation.

*Lupins*

Although the July-December period in southern areas was the driest on record, the average yield of lupins over 11 trial sites was 585 kg/ha with yields up to 1 800 kg/ha. The results suggest that lupins are much better able to cope with spring drought than previously thought.

Dry matter yields of 6 000 to 7 000 kg/ha were recorded on the North Coast from Weiko 3 yellow lupins when sown into pasture in March; Ultra produced high grain yields of over 2 700 kg/ha on basaltic soils.

At Cowra, wheat yields in 1977 increased by 23 per cent following a crop of lupins grown in 1976.

*Mung Beans*

Regur was better suited to early November plantings than other mung bean varieties in research at Tamworth. Yields from November 7th plantings were more than double those from January 4th. On the North Coast, Regur showed good tolerance to field weathering compared with Berken which is prone to rapid seed quality deterioration.

## PASTURES

*Species Breeding and Selection*

The Department commenced a lucerne breeding programme at Yanco Agricultural Research Centre. The objectives include the production in the short term of a semi-dormant variety resistant to spotted alfalfa aphid and blue green lucerne aphid to replace Hunter River. Direct selection methods within the locally bred variety Falkiner will be used. In the longer term, the programme aims to produce varieties for both hay production and grazing which will have resistance to other pests and diseases and with adaptation to specific N.S.W. environments.

*Species Evaluation*

Imported lucerne varieties from U.S.A. are being evaluated throughout the State. Early results are promising, indicating that some U.S.A. varieties are as productive as Hunter River in the absence of aphids and have a very major advantage when aphid infestations occur.

A major evaluation of annual medics, which are also threatened by the aphids, was commenced at Tamworth Agricultural Research Centre and throughout the medic zone.

On the North Coast, Kenya white clover, grown in association with kikuyu grass, has given higher animal production than Haifa white clover over a three year period. In the Northern Slopes, Haifa white clover and woolly pod vetch established by simulated aerial sowing methods have been very persistent and productive.

On the South Coast, a low formononetin type of red clover derived from Quinequeli was extremely promising.

An evaluation of the nutritive value of the dominant native perennial grasses on the North West Slopes identified two outstanding species of good potential, *Danthonia linkii* and *Stipa variabilis*.

The evaluation of annual legumes in the south west wheat belt showed that Northam subterranean clover is a suitable replacement for the moderately oestrogenic variety Geraldton. Screening of the national collection of subterranean clovers for resistance to blue green lucerne aphid commenced at Yanco.

*Establishment*

On the Central Tablelands, lucerne and phalaris, aerially sown into chemically controlled native pastures, produced 14 times as much as the native pastures.

On the South Coast, glyphosate was used extensively to both suppress and eliminate kikuyu grass. It combined very effectively with the triple disc seeder for establishing winter growing pastures.

*Nutrition*

Experimental and simulation studies of soil phosphate and of phosphate uptake by plants conducted at Wollongbar have shown that the long term reaction of fertilizer phosphate with soils is significant. The rate of the reaction is the same for soils of very different phosphate absorption capacities.

Further analyses of past stocking rate superphosphate experiments gave good relationships between pasture grown, animal, year and animal performance; these relationships can be used in the "Decide" model which is being developed at Wollongbar as a fertilizer management tool.

A survey conducted from Grafton Agricultural Research Station showed that where more than 1 000 kg/ha superphosphate had been applied with no further applications for three to four years, soil tests remain above 30 ppm P (bicarbonate P test).

The amount of ammonia in the air above grazed pastures is being measured at Wollongbar to obtain an estimate of nitrogen loss associated with grazing.

Research Agronomists at Wollongbar, Glen Innes, Tamworth, Condobolin and Canberra were involved in defining more closely the need for sulphur, particularly in relation to phosphorus requirement, to increase the efficiency of fertilizer use. They also evaluated different forms of fertilizer sulphur.

Acid soils are of increasing concern. As well as field trials with lime, work is in progress at the Agricultural Research Institute, Wagga, to determine the adaptation of a wide range of pasture legumes to aluminium and manganese using controlled screening methods.

*Management and Production*

In the final year of a three year investigation at Wagga, cattle again gained significantly more weight on a mixed lucerne/subterranean clover pasture than on subterranean clover alone. Low seeding rates of lucerne in the mixture did not reduce production. Liveweight gains on these pastures during the period of high bloat incidence (August/September) were 36 per cent greater in steers in which bloat was controlled with slow release capsules than in untreated steers.

Research at Glen Innes indicated that the inclusion of improved grass species in pasture failed to increase wool production compared with similarly treated natural pastures.

Interactions between weeds, pastures and grazing animals have been reviewed at Orange to assess the economic importance of weeds in pastures.

*Climatic Studies*

In attempts to define quantitative relationships between growth rate of pasture species and temperature, experiments at Wollongbar have clarified the complex interaction between day and night temperatures.

## WEEDS

Silverleaf nightshade in the southern wheat belt can severely reduce annual pasture production and crop yields. Cultivation has been shown to be an important means of spreading this weed. Wild radish is also spreading rapidly through this area. Early spraying of wild radish with selected herbicide mixtures can give very good control.

Johnson grass is a widespread weed of roadsides and agricultural land in the central wheat belt. Its ecology and control by herbicides is being investigated.

In the northern irrigated areas, thornapple can drastically reduce summer crop yields. Bentazone sprayed twice (at 4 and 8 weeks after sowing) gave the best control in soybeans. This research is being extended to mung beans.

In the M.I.A., barnyard grass in a combine-sown rice crop was controlled as effectively by Saturn (R) as by molinate. Saturn (R) applied early post-emergence produced yields equivalent to those when molinate was used.

Knowledge of the rate of spread of weeds has been shown to be essential if regional or Statewide control programmes are to be effective.

(R) Registered trade name.

# HORTICULTURE AND HORTICULTURAL PRODUCTS

### CITRUS FRUITS

*Citrus Improvement — Rootstocks and Varieties*

Rootstock trials with a range of citrus fruits are planted at Gosford (Somersby Section), Yanco and Dareton. These include Valencia orange scions (all three stations), navel oranges (Gosford and Dareton), lemons (Gosford and Dareton), grapefruit and Ellendale tangors (Dareton) and mid-season oranges (Gosford and Yanco).

In 1971 and 1973 plantings at Gosford, Taylor Eureka lemon on local rough lemon rootstock and a red lemon selection from India yielded well. Benton citrange (*Poncirus trifoliata* x Ruby Blood) is a promising rootstock for Eureka, supporting earlier results at Yanco.

Estimated yields per unit area for Valencia oranges (1958 plantings) on a range of rootstocks at Gosford have been highest on *Poncirus trifoliata* and Troyer citrange.

*Planting Density and Tree Size Control*

For some years, the Department has been investigating transmission of dwarfing associated with exocortis virus to reduce tree size. Relationships between tree density and productivity should be able to be more closely defined as results become available from a spacing trial of uninoculated, and dwarf inoculated, Valencia oranges planted at Yanco in 1973. Several interested growers have established small commercial demonstrations of dwarf tree plantings in the Murrumbidgee Irrigation Areas.

*Mechanical Harvesting*

The Agricultural Engineering Centre built an experimental air-blast citrus harvesting machine, based at Yanco, for comparison with other methods of tree shaking.

*Salinity and Irrigation*

Improved techniques for using saline irrigation water are being investigated at Dareton. Nutritional studies should give a better understanding of mechanisms for salt-avoidance by citrus rootstocks.

*Post Harvest Research*

In screening tests, the fungicide guazatine effectively controlled *Penicillium* moulds and sour rot *Geotrichum candidum* of citrus fruit.

Queensland fruit fly disinfestation research, aimed at meeting Japanese quarantine requirements, continued at Gosford. Fumigation of lemons with ethylene dibromide using schedules of 24 g/m$^3$ at 20°C, 31.2 g/m$^3$ at 15°C and 40.4 g/m$^3$ at 10°C gave effective control. The data were forwarded to Japan for consideration.

## STONE AND BERRY FRUITS

*Varieties and Rootstocks*

*Peaches* — High yielding clones of Golden Queen canning peach, including selections with maturity dates ranging from early February to mid March, were compared at Yanco. Of the early varieties, Yanco Queen was the most promising; the highest yielding late maturing selection was Taylor Queen.

*Prunes* — In a trial at Yanco, Buck plum was a suitable rootstock for d'Agen prune, producing the largest trees and the highest yields. Closer planting of trees on the more dwarfing stocks, however, would improve yields on an area basis.

*Strawberries* — Two selections from the breeding programme at Gosford, N77/26 and N77/35, have been retained for further study. Selection N72/14 was discarded from future tests because of base-cracking in early season berries. Runners produced in the laboratory from meristem tissue culture performed normally in field tests.

*Miscellaneous Berries* — A collection of bramble berries and varieties of red and black currants are being maintained and evaluated at Bathurst.

*Pruning, Tree Training and Crop Regulation*

Improved tree training systems were compared in high density plantings of dessert peaches at Bathurst and canning peaches at Yanco.

Butt and limb shakers appear promising for mechanical thinning of peaches, plums and nectarines. However, thinning d'Agen prunes mechanically reduced dried fruit yields of trees growing under dryland conditions at Young.

*Mechanical Harvesting*

A shake-catch harvest and trailer collection system for fresh market cherries has been developed and evaluated in the Young district. A shock-wave butt shaker harvested fruit of mid-season and late maturing cherry varieties satisfactorily following pre-harvest sprays of ethephon and daminozide.

*Post Harvest Research*

In tests with new fungicides, iprodione gave excellent control of both benzimidazole tolerant and sensitive strains of the fungus *Sclerotinia fruticola* that causes brown rot of peaches.

Histological examination of surface pitting of sweet cherries, a severe injury often developing on fruit in cool storage, showed that the lesions are caused by collapse and necrosis of parenchyma cells of the outer fleshy mesocarp tissue. There is evidence that the damage results from impact bruising of the fruit.

## POME FRUITS

*Rootstocks, Tree Training and Spacing*

Four tree training systems, vase, Hawkes Bay, pyramid and palmette, and different tree spacings ranging from 440 trees/ha to 862 trees/ha are being assessed at Orange. The three apple varieties are Delicious, Jonathan and Granny Smith, each on the rootstocks MM106, MM102, Northern Spy and Seedling (planted between 1969 and 1971). In the early years of cropping, pyramids and palmettes yielded more than other systems with all varieties regardless of rootstock, although cropping is becoming more even as the trees mature.

After eight years of cropping, overcrowding in the closest plantings now appears to be causing yield reductions.

Quince A rootstock, used with an intermediate stempiece of Beurre Hardy, showed promise for producing semi-dwarfed pear trees.

*Mechanical Pruning*

In pilot trials at Bathurst, a butt shaking machine gave promising results for spur pruning dormant mature pear trees. The effects of mechanical hedging, including winter and summer pruning treatments, used in conjunction with a growth retardant to control vegative regrowth, are being assessed on apples and pears at Bathurst, Orange and Batlow.

*Storage*

Experiments in N.S.W. and New Zealand showed that deep dipping of apples in calcium chloride solutions after harvest gave good control of bitter pit and low temperature breakdown. Best results were obtained with the closed calyx varieties, Granny Smith and Cox's Orange Pippin.

In cold sterilisation tests at Gosford, each involving more than 100 000 insects, 22 days storage at 2.5°C, 18 days at 1.5°C or 16 days at 0.5°C gave complete kill of Queensland fruit fly larvae in artificially infested apples. The aim of the work has been to develop treatments to meet quarantine requirements of Japan and the U.S.A.

## TROPICAL FRUITS

### *Bananas*

Studies commenced at Alstonville on the effects on banana establishment of planting material weight and the state of bud development. Weight of planting material is a major component of variation in young banana plants. More uniform stands can be produced by trimming. Research on forecasting banana production indicated that low supplies of bananas in winter are caused by slower growth rates and the fewer bunches that emerge in January/February. It may be possible to increase winter production by delaying the spring peak possibly at the expense of total annual yield.

### *Avocadoes*

Soil management treatments to suppress *Phytophthora cinnamomi* are being assessed for their effects on growth and yield response of avocadoes. Highest growth rates came from inter-row cover cropping and the addition of soil treatments including calcium and organic material.

### *Macadamias*

Ethephon showed promise as an abscission agent and for use as an aid to harvesting of macadamias.

### *Other Tropical Fruits*

Following taxonomic and physiological studies of litchi varieties, Kwai Mai and Bengal appear to be the best yielding varieties. Clonal guava selections were established at Alstonville and Yanco to asses their yield potential for fresh fruit and juice.

## GRAPES AND WINE

### *Vine Improvement*

#### *Varieties and Clones*

High yielding clones of the more important grape varieties are being selected and evaluated at Griffith and Dareton. Approved clonal sources of the varieties Shiraz, Pinot Noir, Cabernet Sauvignon, Italia, Barbera, Rubired and Semillon were gazetted under the Horticultural Stock and Nurseries Act. An imported Swiss clone of Pinot Noir, Mariafeld, yielded well with high quality fruit; it appears less susceptible to bunch rot than other clones of this variety.

#### *Rootstocks*

The use of nematode resistant rootstocks including Salt Creek, Dogridge, 1613 and Schwarzman improved yields of Shiraz and Cabernet Sauvignon in replant areas in the Griffith district. A similar experiment with Semillon was planted in 1976.

#### *Irrigation*

Wines made from non-irrigated vines had greater colour density, higher levels of anthocyanin and phenolics, and appeared to mature more slowly than wines made from irrigated grapes.

#### *Pruning and Trellising*

Pruning Shiraz vines in late spring rather than in winter delayed berry maturity by several weeks; acid levels in the fruit were higher and the resultant wine colour was more intensive.

A trial comparing methods for retraining Trebbiano vines from a single wire to a trellis was completed at Yenda. Results showed that the old cordon was best cut out after two or three years, when two or four canes were used to retrain.

#### *Harvesting*

At Dareton, the Department is assessing the effectiveness and efficiency of several machines used to spray vines with alkaline oil emulsion for the production of trellis dried sultanas. The addition of ethephon to the spray emulsion assisted in the removal of capstems during processing of the dried fruit.

## VEGETABLES

*Potatoes*

Several potato seedlings bred at Glen Innes and tested at Yanco significantly outyielded Sebago and look promising for the south west irrigation areas.

Work with *Solanum andigena* hybrids and the reducing sugar levels of *Solanum goniocalyx* is continuing. Observations at district level and storage/cooking tests at Orange showed that S3041, S3074, S3085 and S3024 were outstanding.

Physiology investigations at Orange demonstrated good correlations between predicted yield and actual yield when using a working model developed by CSIRO. At Yanco, the optimum irrigation frequency during hot periods may be 1-2 days. Tuber yield and size in the autumn crop were reduced with each week's delay in planting.

*Tomatoes*

Breeding indeterminate type tomato hybrids with combined resistance to Fusarium and Verticillium wilts and nematodes, and testing introduced fresh market tomato cultivars continued at Richmond and Gosford. H-3 (65N — 215-1 x Tropic) and H-41 (Nematex x Tropic) were the two outstanding resistant lines. Strobelee was still the most promising fresh tomato cultivar. Processing tomato trials were again conducted at Leeton, Cowra and Trangie. UC 82A, Castle Hy 1204 and GS 9 were suitable for paste. No variety was superior to VF Napoli for whole peel production.

*Rockmelons*

Guazatine and benomyl in combination will control the major post harvest diseases. The use of polythene enhanced early rockmelon production. Grade standards, in part based on ontogenic research at Yanco, have been introduced.

*Capsicums*

Following a successful trial, No. 2 line, derived from "Hungarian Yellow Wax" x Californian Wonder and backcrossed twice to Californian Wonder, will be considered for release.

*Miscellaneous Vegetables*

Variety trials at the Horticultural Research Station, Gosford, indicate the best varieties of various vegetables and their attributes as being:—

| | | |
|---|---|---|
| Lettuce | — | Imperial D and Imperial Triumph had the best frost tolerance |
| Celery | — | Can be grown successfully through late summer autumn and early winter |
| Cabbage | — | Headstart and Green Globe as early varieties |
| | — | Savoy Ace, Terrific and Summer/Autumn as mid-season varieties |
| | — | Hi Yield as a late variety |
| Zucchini | — | Blackjack, Seneca, Nigger Boy, Elite and Green Buttons |
| Broccoli | — | Premium crop and No. 160. |

## ORNAMENTALS

*Potting Mixes*

A suitable potting mix for most plants can be produced by composting hardwood sawdust with urea for seven days before mixing with other constituents such as peat (20 per cent) and sand (10 per cent). For more sensitive plants it is necessary to compost the sawdust with a complete fertilizer mixture for one month or more. In both cases, steam treatment of the final mixture (60°C for 30 minutes) reduced phytotoxicity of the sawdust component.

*Waratah Nutrition*

Waratah seedlings were grown in pots with varying levels of N P and K. There was little growth response to N and high N usually killed the plants due to Phytophthora root rot.

# LIVESTOCK AND LIVESTOCK PRODUCTS

## ANIMAL PRODUCTION RESEARCH

Animal production research is currently concerned with the wool, sheep meats, beef, dairy, poultry and pig industries as well as with the management of noxious and feral animals. The majority of research programmes are multidisciplinary and often involve collaboration with researchers in other Departmental Divisions, CSIRO and universities. Departmental Advisory Officers play a critical and increasing role in contributing to the planning, execution and interpretation of research; even more critical are the essential activities which foster the adoption or non-adoption of technology as dictated by regional biological considerations and economic factors. The Department's Animal Production Research activities are strongly financially supported by several industry research funding bodies.

*Carcase Composition*

In the past year a number of major studies related to carcase composition were concluded. Scientific and extension publications of substantial significance to production systems, to product quality control and to carcase classification systems in the sheep meat arena are being prepared. These data highlight the levels within and between breed differences in carcase composition, the effect of growth rate and pattern on carcase composition, the lack of consumer detectable differences in tenderness between lamb carcases and aspects related to the effect of body conformation on carcase quality. Additionally, data are now available on the effect of selection procedures on carcase composition of poultry. Between breed differences in carcase composition and environment/genotype interactions have been studied in selected beef breeds. Final analysis of information collected in a major study aimed to predict muscle content in pigs is underway, and further studies have commenced investigating the problem of grass seed infestation in sheep carcases. A senior Research Officer from the Animal Production Research Group with expertise in meat composition and classification has been appointed to co-ordinate Departmental activities related to the implementation of carcase classification.

*Animal Nutrition*

Reflecting the supreme importance of the amount and type of feeding to productivity in the animal enterprises, considerable emphasis continues to be placed on such studies as:

- utilisation of low quality roughages by ruminants
- evaluation of Australian feedstuffs for ruminants and non-ruminants
- amino acid utilization by non-ruminants
- feed requirements of fattening lambs and breeding ewes
- pasture development programmes and the efficiency of fertilizer use.

*Animal Breeding*

Animal breeding programmes continue to provide the focal point for many studies either of immediate significance or of a more long term character. Wool growth efficiency studies using sheep selected for and against increased wool growth, reproductive studies in sheep differing genetically in their reproductive capacities and studies concerned with the blowfly problem are being undertaken on several sheep strains including sheep selected for and against fleece rot susceptibility.

Additionally, the genetic studies provide objective measures of the response to selection and identify means whereby such responses can be obtained in the field. Crossbreeding studies in beef cattle have identified major biological gains under various environmental and nutritional conditions. The Animal Production Research Group has a major commitment to foster the objective measurement and recording of animal performance, a practice which is receiving increased acceptance in all animal industries.

Alteration of net reproductive rates continues to represent a major avenue through which the efficiency of animal production might be altered. Accordingly, approximately one fifth of the Group's activities are orientated towards either genetic improvement of reproductive rate, overcoming specific genetic problems, or monitoring reproductive performance in the field. The analysis of data collected by the Sheep Fertility Service has provided a unique basis for the development of extension strategies and for assisting in the determination of future research priorities.

*Diversification*

The majority of domestic and export earnings from livestock enterprises will depend, at least for the foreseeable future, upon the production of traditional animal products. Nevertheless, increased diversity of products and of production systems could provide some primary producers with means of increasing and/or stabilizing income. The Animal Production Research Group is undertaking a number of studies aimed at facilitating or initiating diversification schemes. For instance, research assistance is being provided to producers involved in carpet wool production, in the use of goats for weed control, in the production of goat meat and possibly, in the future, cashmere. Feasibility studies of sheep and goat production in coastal environments and of artificial lamb rearing associated with sheep milking production are underway. Improvement of the spinning quality of black wool and determination of the characteristics of sheep meat from hoggets is also being studied.

*Noxious and Feral Animals*

The Animal Production Research Group is also involved in studies aimed at developing control and management strategies for wildlife species which currently have an impact on agricultural enterprises in New South Wales. Greatest effort is directed towards the control and management of feral pig populations in central and western New South Wales, and to the control of rabbit populations. Following major mouse plagues in the early 1970's throughout much of New South Wales, research commenced to develop rodent control measures. These studies which have also had the objective of developing contingency plans for rodent control are nearing completion.

## DAIRYING

*Lactational Physiology and Milking*

New radioimmunoassays were developed to measure the hormones prolactin and oestradiol-17B in milk and other mammary secretions, and for more accurate measurement of 2-lactalbumin in milk. The concentration of prolactin and oestradiol-17B in milk was similar to, and followed changes in blood plasma.

Many commercial milking machine components were evaluated for their milking performance and tendency to spread mastitis using a new test rig which simulates normal milking. The cause of teatcup slip in certain commercial milking machines was found by experiment to be a combination of alternate pulsation, narrow liners and heavy claws. Otherwise, milking performance was consistently good. The general practical conclusion was that standard systems performed well, but certain mixed systems were likely to spread mastitis.

*Sheep Milking*

Forty assorted crossbred ewes were milked by machine once or twice daily for 2-16 weeks before and after weaning of their lambs. Mechanical, physiological, anatomical and behavioural factors affected the efficiency of milking. Twice daily milking of ewes after their lambs had been weaned, successfully maintained lactation, but milking once daily did not. After 7-14 days training, these ewes yielded 50-90 per cent of their total milk (judged by removing the residual milk with oxytocin) or approximately 750 ml/day. Once daily milking of ewes with lambs harvested 40-60 per cent of the total milk or approximately 500 ml/day. Growth rate of the lambs was close to normal. The milk ejection reflex was apparently not occurring in these ewes because milking after adrenaline administration or under general anaesthesia gave the same yields as regular milking. The efficiency of milking was affected most by the mammary gland anatomy. Ewes with large teats which point downwards and with a shallow groove between glands appear to be better suited to machine milking. In a portable milking parlour such as this, approximately 80 ewes/man hour could be milked. Some problems with coliform contamination were encountered, but the milk was suitable for Fetta cheese manufacture.

*Dairy Hygiene and Sanitiser Residues*

A technique utilising a dye and penetrant solution and ultraviolet light was adapted to detect stress cracks in large stainless steel vessels as these are possible sources of pathogens such as Salmonella.

A particular causal relationship was established between *Bacillus cereus* from grain feeders and the occurrence of "bitty" cream in milk. This is a common milk defect in summer months in N.S.W.

A survey on 50 farms of the incidence of milk deposits in milking equipment showed that, irrespective of the cleaning system used, deposits were common in taps, sightbowls, joints and bends. Examination of the microflora of these deposits revealed that they were a major source of bacteria.

The fate of iodophor-derived residues in milk during processing was studied. Pasteurisation, spray drying and casein precipitation resulted in changes in the protein binding of iodine such that some concentrated milk products could contain high iodine levels.

*Dairy Products*

Many factors affecting the proliferation of pathogenic staphylococci in cheese were studied. The various cheese starter cultures could be divided into two groups: one inhibited staphylococcal growth, the other did not. The mechanism appeared to involve the production by the starter bacteria of hydrogen peroxide and a dialysable substance which has not yet been identified.

## LIVESTOCK DISEASES AND DISORDERS

*Bluetongue*

Considerable effort has been devoted to bluetongue since its recognition in Australia in 1977. The Virology Laboratory at Glenfield was selected to develop the gel diffusion test for serological diagnosis. This was done successfully and the procedure is now used in many Australian and New Guinea laboratories as a standard diagnostic test. Glenfield supplies the reagents for the procedure and acts as the Australian reference laboratory.

Intensive investigations have continued to determine the N.S.W. status in regard to this disease. Results may be summarized as follows:—

- No clinical cases of bluetongue disease have been recognized.
- There is blood test evidence of the presence of viruses related to, if not identical, with the bluetongue group of viruses. There is no evidence of the presence of CS 19, the original virus isolated in northern Australia, being present in New South Wales. There is, however, some evidence of the presence of type 1 virus.
- Very few blood reactions have been detected in sheep.
- Many cattle have given reactions. Most of the reactor cattle have been on the Central and North Coast and around Moree with relatively few in other parts of the State. The incidence of reactors has been higher in older cattle.

*Worm Resistance to Anthelmintics*

Worm resistance to anthelmintics is an emerging problem in the sheep industry as it can seriously interfere with effective internal parasite treatment and control.

Work to date indicates that resistance in barbers pole worm *(Haemonchus contortus)* is geographically widespread and, in some areas, is relatively common. Resistance has also been found in the black scour worm *(Trichostrongylus colubriformis)* but it seems to be much less common. Resistance has also been suspected in brown stomach worm *(Ostertagia circumcincta)*.

Extensive investigations have been made into the nature and extent of this resistance. Thiabendazole is the anthelmintic to which resistance is most commonly shown.

Strains of barbers pole worm, which are resistant to thiabendazole, have been shown to display resistance to other anthelmintics of a similar chemical composition (the benzimidazole group). However, they did not show resistance to anthelmintics which are chemically unrelated. These are referred to as non-benzimidazoles and include napthalophos, oxyclozanide, nitroxynil, levamisole.

As part of these investigations a reliable and simple procedure has been developed for determining resistance to anthelmintics. The test uses worm eggs in a laboratory procedure. The older and much more expensive method involves the slaughter of sheep.

*Nardoo and Brain Damage*

Field evidence had suggested a possible relationship between the eating of Nardoo *Marsilea drummondii* and brain damage in sheep. The problem has been investigated from a number of aspects and the main findings to date have included:

- The demonstration that Nardoo can contain exceptionally high levels of the enzyme thiaminase. This enzyme can destroy the essential vitamin, thiamine, and thus induce thiamine deficiency disease.
- New analytical procedures have been developed from thiaminase in plant material and faeces.

- A condition of thiamine deficiency has been induced in chickens by the feeding of Nardoo.
- A retrospective investigation of the sheep disease has yielded information on the occurrence and distribution of the condition.

*Viral Contamination of Avian Vaccines*

Heavy mortalities, poor feathering and loss of body weight in chickens occurred throughout Australia in 1976. Subsequent evidence showed that the problem was due to viral contamination of certain avian vaccines. This, in turn, led to further investigations of the problems.

The contamination occurred in Herpes virus of Turkeys (HVT) vaccine and in a Marek's Disease vaccine. Further work showed that the contaminant was reticuloendotheliosis virus (REV) and this was confirmed by workers in the United States of America.

The pathogenicity of REV and methods of detecting it in commercial vaccines were investigated. Sources of virus from New South Wales, Victoria and Queensland were tested for pathogenicity. All three induced abnormal feather development but only the N.S.W. isolated induced clinical disease with leg weakness and gizzard erosion. Other workers suggested that the natural infection may occur in Australia, and that the disease is more severe in the chickens from negative parents than in those which have experienced infection.

Because of the concern by the turkey industry, a trial was conducted on turkeys held under different environmental conditions. This showed that infection of turkeys was possible, at least under laboratory conditions.

*Viral Scours of Cattle and Pigs*

Scours are very common, especially in young animals and recent work has suggested viruses as possible causes. Electron microscopy has been developed successfully as a research and diagnostic tool. However, it requires access to elaborate equipment so alternate methods of diagnosis were investigated. This led to the successful development of a gel diffusion test which can be applied to faecal extracts to detect the virus. The results from this procedure correlated very well with the results of the electron microscope method.

## BIOLOGY

*Plant Diseases*

Since the withdrawal of hexachlorobenzene and the organomercurials as seed dressings in 1972, cereal growers have not had an adequate range of chemicals to protect their crops against the ravages of bunts and smuts, as evidenced by the loose smut problem in 1977. Ordinarily the small amount of loose smut is of no real consequence. However during last season, the spores in the heads did not blow away, but became hardened into small black bodies that contaminated the harvest and resulted in some dockages at the silos.

During 1977/78 a number of new bunticides were registered for treating wheat and other cereals; two of these fungicides have a wide spectrum of activity against the whole range of bunts and smuts. Registration of these chemicals was advanced by the work of Biology Branch staff at Wagga. Cereal growers are now in the position of having more registered chemicals available for bunt and smut control than ever before.

Bunch rot of grapes in the Hunter Valley is a particularly devastating disease resulting in considerable loss of harvestable grapes and the lowering of quality of wine produced from the infected bunches. The disease in the Hunter Valley is as damaging as in any part of the world and little progress had been made towards reducing the losses by application of fungicides. The Biology Branch initiated new work in the Hunter Valley last season to examine the efficacy of a range of fungicidal spray programmes. New studies on the etiology and epidemiology of bunch rot were also initiated. While little useful information came from the work with fungicides, the epidemiological studies indicated that the problem of bunch rot in the Hunter Valley may be compounded by cultural practices. More work will have to be done, but it is encouraging to have some evidence that grape growers need not be entirely at the mercy of the weather.

The Biology Branch project on disease resistance in beans was virtually completed during 1977/78. The programme, which commenced in 1965, aimed at solving the problem of summer death, which all but destroyed the green bean industry in inland New South Wales, and rust (caused by *Uromyces appendiculatus*) which is severe

on coastal crops and late autumn crops in inland New South Wales. With the completion of a study on the genetics of resistance of the bean rust fungus, the green bean industry in Australia is now in a much sounder position than it has been for many years, although seed quality remains a problem. This could be overcome by using improved varieties. Hopefully, some progress has been made towards convincing the local processors and seedsmen of the need to change varieties following the visit of Dr M. H. Dickson from the Agricultural Experiment Station at Geneva, New York. Dr Dickson, a prominent bean breeder, spent six months in the Biology Branch and made a thorough study of the local green bean industry.

Work on Septoria leaf blotch of wheat was disadvantaged because of the drought which lasted throughout much of the winter and spring in southern New South Wales. Work on this project deserves particular mention because it is seen as the most damaging of all crop diseases in New South Wales. The disease has been in epidemic proportions for a number of years and the Biology Branch, together with the Division of Plant Industry, have assembled a group of scientists to research the problem. Because of the dry winter and spring of 1977, most of the experiments laid down last year will need to be repeated in 1978.

Some useful progress was made on the ecology of *Septoria* spp. present in New South Wales and their importance in the field. Although the main problem in southern New South Wales is caused by *S. tritici*, two other species *S. nodorum* and *S. avenae* f.sp. *triticea* occur within the State. The distribution of each was determined by examining field collections made during 1975, 1976 and 1977. Progress of each disease was followed at Wagga Wagga in 1976 and throughout the State in 1977. Additional records of *S. tritici* and *S. nodorum* dating back to 1913 and 1927 respectively were obtained from the Biology Branch Herbarium. The study is providing a wealth of valuable information on the relative importance of these pathogens that will enable the Branch to allocate resources to the problem according to need.

New work on treatment of seeds to remove pathogens was initiated in 1977. Many important diseases are seed borne, but there is little information available on the levels of infection present in the seed used in New South Wales. More importantly, there is little information on the effectiveness of different treatments. Most seed is not treated, save for the use of some fungicides to protect against seed decay.

In addition to pathogens, seed can carry a range of bacteria and fungi that may be weakly pathogenic without being actively parasitic. The development of seed treatments to eliminate these organisms may improve seed quality and seedling growth.

The project will be expanded over the coming years to investigate all forms of seed treatment, but for the present, the emphasis has been on the use of low temperature steam and the invigoration of heat damaged seed. A technique developed overseas to invigorate damaged seed has been applied to seed treated with low temperature steam with encouraging results. These techniques will be followed to investigate both the parasitic and non-parasitic flora of seed and their effect on seed quality.

*Systematics*

A research highlight of the Biology Branch is the activity in the Herbarium. Over 1 500 specimens were received during the year, bringing the collection to almost 45 000 specimens. Over 28 000 records are now on computer tape.

The Herbarium continues to provide information and identification of parasitic fungi to plant pathologists in Australia. During the year, a report on the recording of plant disease survey information was prepared for the Plant Pathology Committee of Standing Committee on Agriculture. The methods used in the Herbarium could well serve as a basis for the more accurate recording of information on plant diseases in Australia.

Work also continued on the preparation of check lists of plant diseases occurring in New South Wales and Norfolk Island and considerable assistance has also been provided for the preparation of check lists of plant diseases occurring in Tasmania and South Australia. These activities were in addition to the normal curatorial activities and taxonomic work on Australian smut fungi, cereal take-all fungi and sundry other important pathogens of native and introduced plants.

*Soil mycorrhiza*

A project supported by the Australian Wool Corporation and the Australian Meat Research Committee was initiated to investigate the possibility of culturing the ubiquitous fungal endophytes that play an important role in the uptake of nutrients by most crop plants. There is good evidence that a free living form of these fungi has been isolated in pure culture and some success has been achieved in using these isolates to re-inoculate plants. Some progress has also been made towards culturing the endophyte stage, but this work has not reached a point where the fungus can be used to re-inoculate plant roots.

# ENTOMOLOGY

*Lucerne Aphids*

The increasing threat of exotic insect pests was exemplified by the severe and widespread damage to lucerne and other legumes during 1977/78 caused by two aphid species — spotted alfalfa aphid *(Therioaphis trifolii)* and blue green aphid*(Acyrthosiphon kondoi)*. A substantial research programme was initiated on this problem involving reallocation of Branch resources as well as a special Treasury grant. Major projects included a survey of aphid abundance and damage throughout the State and a population monitoring project at six widely spaced sites. In the latter, aphid life stages, diseased and parasitised aphids, and beneficial insects were sampled at weekly intervals as well as recording water trap catches of winged aphids. The two projects provided a picture of the fluctuations and spread of the aphids during the first 12 months of establishment in New South Wales. They also indicated the effects of native predators and changes resulting from manipulation of lucerne management.

Field trials established minimum effective rates of suitable insecticides and the following are now in use as standard commercial practice — demeton-s-methyl at 37.5 g ai/ha; dimethoate at 60 g ai/ha; thiometon at 37.5 g ai/ha; pirimicarb at 50 g ai/ha.

Mass release sites were established at Cowra, Wellington and Muswellbrook for introduced parasites of the aphids, in co-operation with CSIRO. Although drought conditions in summer retarded establishment of the parasites, there was evidence very late in the season that one species *Trioxys complanatus* had established at two sites.

*Insecticide resistance*

A major problem is insecticide resistance in a number of important insect and mite pests. An important study of green peach aphid *(Myzus persicae)* and a survey of resistance patterns in different parts of N.S.W. and in Queensland (in co-operation with Department of Primary Industries, Brisbane) have shown that resistance to the standard control chemicals demeton-s-methyl and dimethoate is spreading. There was also evidence of cross resistances to even the relatively new synthetic pyrethroids. All N.S.W. strains appear to be susceptible to carbamate insecticides, which are satisfactory alternatives, but one Queensland strain has shown moderate resistance to several carbamates.

Another area of great importance concerns pests of grain and stored products. Resistance surveys have established that lepidopterous pests *(Plodia interpunctella* and *Ephestia spp)* are exhibiting widespread resistance to maldison but that the newer synthetic pyrethroids and pyrethrins are promising alternatives. For the first time, officers of the Branch took part in the assessment of stored grain protectants in silo-scale bulks of grain. This was in collaboration with the Grain Protectants Working Party which includes representatives of government departments, bulk handling authorities and involves liaison with industry. Data have been provided on application practice, residue breakdown and efficacy of several new materials against insects for submission for international approval and registration for grain use.

*Pest management in relation to reduced pesticide usage:* This is an increasingly important area of research. Two projects in particular have shown interesting results during 1977/78. The introduction by CSIRO of *Typhlodromus occidentalis,* a strain of predatory mite, from U.S.A. resistant to organophosphate insecticides (used for control of the primary pest of apples, codling moth) has shown considerable promise for controlling 2-spotted mite in apples, thus eliminating several cover sprays per season. Entomologists at Bathurst commenced a large breeding and release project to give a positive thrust to this work. Releases were made at 21 sites and results monitored. Establishment has been good at several sites and the project shows considerable promise.

Progress has been made in the development of a pest management programme in crucifers. An American bred variety of cauliflower has been field tested. Although it appears to have no resistance to our race of cabbage butterfly *(Pieris rapae)* it is resistant to first instar larvae of cabbage moth *(Plutella xyeostella).* Mixtures of very low rates of standard insecticides with *Bacillus thuringiensis* have also showed some promise against *P. rapae.*

*Mushroom Pests*

New research initiatives have been taken in regard to the problems of mushroom pests. In collaboration with the Mushroom Growers Association, considerable progress was made in the understanding of mushroom mite and insect problems. Research has enabled registration of a granular formulation of pirimiphos ethyl for mushroom pest control.

*Citrus Dieback*

Virus transmission and electron microscope studies have not yet determined a causal agent for citrus dieback although several insect species have been suspected as transmitting agents. Work is being expanded in the field of virus vectors generally.

*Taxonomy*

A major effort has been made to upgrade and expand the taxonomy section of the Branch. This includes the curation of the large Insect Collection and the development of specialist systematic studies on native predatory mites and certain groups of plant-sucking bugs. This section is seen as closely integrated with pest management studies indicated above as there is a major need for taxonomic studies of the many beneficial insects (parasites and predators) which require detailed attention in such programmes.

# CHEMISTRY

## ANALYTICAL CHEMISTRY

*Aluminium*

Iron was found to interfere in the determination of aluminium by molecular fluorescence spectroscopy by forming a complex which absorbed excitation and fluorescent radiation.

*Inductively Coupled Plasma*

An evaluation of inductively coupled plasma (ICP) atomic emission spectroscopy has commenced. If found suitable, this multi-element technique (more than 40 elements can be determined simultaneously) will replace current methods used in the routine inorganic analysis of plants, soils and waters.

*Soil Survey*

Soil Surveys of the following areas were continued: Mid Clarence Valley, Peel River, Shoalhaven River, Grafton Agricultural Research Station, and Narrandera. Soil landscape maps were produced for the Clarence and Peel surveys.

*Irrigation and Soil Structure*

The movement and deposition of clay in soils under the action of water and its effect in reducing water infiltration were studied. An equation which will predict infiltration rate under field conditions was developed. Thermocouple psychrometers were introduced as a non-destructive method of measuring soil moisture status between the irrigation furrow and the plant root.

## WATER QUALITY

*Mineral contamination*

Nitrate and phosphate levels in the Namoi River system adjacent to cotton areas were well above threshold levels for eutrophication. However, no significant eutrophication has occurred as yet. In contrast, Lake Parramatta, which was badly eutrophied, had very low levels of nitrate and phosphate. This difference is attributed to the very low flow rate and higher temperatures of the water in the lake. When new weirs on the Namoi reduce flow rate, an increase in eutrophication can be anticipated.

*Salinity and Phosphorous Nutrition*

When tomato plants were grown in a glasshouse on an artificially salinized soil, phosphorous fertilization (200 mg P/kg soil) dramatically reduced salt injury and restored yield losses caused by salinity. This phenomenon may enable much greater use of poor quality, saline waters.

*Control of Muddy Water in Rice Bays*

Muddy water impedes the development of rice seedlings. It was found that adding gypsum to the water as it entered the bay flocculated the mud and enabled normal seedling development.

## SOIL FERTILITY AND PLANT NUTRITION

*Crop Nutrient Status*

A survey of apple orchards at Armidale, Orange and Batlow revealed that zinc was low in many orchards. A survey of potato crops at Robertson, Armidale and Dorrigo found nitrogen, phosphorous and/or potassium deficiencies in a few crops.

*Nitrogen*

The fern Azolla, which contains a symbiotic blue-green alga which fixes atmospheric nitrogen, increased rice yields equivalent to the increase produced by 10-20 kg fertilizer nitrogen. The substitution of legumes for inorganic nitrogen in wheat and oilseed rape rotations continues to be evaluated.

*Phosphorus*

Uptake of phosphorus by white clover on 30 soils from north-western New South Wales correlated best with the soil phosphate extractant sodium bicarbonate. The Bray No. 1 and Mehlich extractants were less effective. On the Central and Southern Tablelands, continued topdressing of pastures with superphosphate is causing a steady increase in soil acidity and a loss of productivity. The residual effectiveness of superphosphate on weakly and strongly buffered soils is being monitored.

*Sulphur*

A new sulphur fertilizer, a porous granulated material with a high internal surface area, was evaluated. Its short-term availability was poor in comparison with gypsum or fine elemental sulphur as its rate of oxidation by bacteria was low.

*Boron*

A survey of available boron in Central Tablelands soils indicated that soils derived from sandstone, granite or fine sedimentary rocks were deficient in boron. Those derived from basalt or alluvial material contained adequate boron for pastures and crops.

*Zinc-Carbonic Anhydrase*

The enzyme carbonic anhydrase was used successfully to measure active zinc in maize and prune trees. Re-activation of the enzyme in zinc-deficient maize was accomplished by zinc fertilization confirming the specificity and sensitivity of the enzyme to changes in active zinc.

*Foliar Absorption*

Physico-chemical studies on the addition of wetting agents to foliar sprays showed that leaf wetting was only complete when the sum of the surface and interfacial tensions of the spray was less than the surface tension of the leaf (23 m N.m $^{-1}$). This knowledge enables sprays to be formulated to achieve any desired degree of wetting.

*Foliar Fertilizers*

In field studies, urea foliar sprays were superior to soil-applied nitrogen as nitrogen sources for prune trees in a drought year. Silicone surfactants, which completely wet leaves, were slightly less effective in these sprays than conventional wetting agents as the silicones produced excessive run-off and excessively fast drying. Reduced retention and uptake resulted.

## CEREAL AND LEGUME SEEDS

*Starch Damage in Wheat Flour*

A procedure for determining starch damage in wheat flour was developed based on the conversion of damaged starch to maltose using an analytical $\alpha$ amylase. The new procedure is more accurate, simpler and much faster than current methods.

*Uses of Durum Flour*

Quality parameters of durum flour, a previously unused by-product of the durum wheat industry, were studied and predictions were made as to possible uses of it. Departmental chemists demonstrated new uses for durum flour which will place the durum wheat industry on a much sounder financial footing.

*Legume Seed Galactomannans*

Galactomannans are polysaccharides used industrially as thickening and gelling agents and gums. The structural properties of galactomannans which enable certain of them to interact at very low concentrations with other polysaccharides to form gels were determined. Legumes could be bred as summer crops for the northern wheat belt with possess industrially desirable properties. A new assay for endohydrolase enzymes based on soluble chromogenic substrates has been developed and patented provisionally.

## STOCKFEEDS AND TOXINS

*Metabolizable Energy in Poultry Feed*

A new method for determining metabolizable energy in poultry feed was developed based on a natural internal marker (acid-insoluble salts).

*Plant Thiaminase and Polioencephalomalacia*

Development of thiamine deficiency and polioencephalomalacia in sheep grazing Nardoo fern was linked to the levels of thiaminase I enzyme and its co-substrate amine bases in the fern. Feeding trials to establish threshold levels of enzyme and co-substrate necessary to induce the condition are in progress.

## PESTICIDES

*Environmental Contamination*

The monitoring of DDT contamination of the environment adjacent to cotton-fields in the Namoi Valley is continuing in conjunction with the State Pollution Control Commission. Aerial drift was largely confined to within 400 m of sprayed fields although traces of DDT could be detected on soil and pastures at greater distances.

*Residues in Food*

Methods were developed for treating fruit with pesticides post-harvest which ensured that residues remained within Australian National Health and Medical Research Council limits, as follows:

ethylene dibromide fumigation of oranges to control Queensland fruit fly;

methyl bromide fumigation of avocadoes; and

sec-butylamine fungicide treatment of citrus, pome fruit and bananas.

*Formulations*

It was found that the inclusion of guar gum in post-harvest banana dips containing benzimidazole fungicides significantly extended dip life.

*Acaricides*

Over three million individual cattle dippings in 800 dips charged with Taktic (R) (amitraz) at 0.025 per cent showed that an average of 1 712 gm of amitraz and 42.2 kg of the stabiliser, lime, was used per 1 000 head treated. Each beast removed 2.35 L of the dipping fluid. The concentration of the ingredients was controlled with a topping rate of 500 gm Taktic and 12.5 kg lime per 700 L water.

There were no detectable residues of amitraz or metabolites in fat, tissues, or whole milk from cattle treated with Taktic. Though butter made from milk collected six hours after treatment had 0.015 mg/kg amitraz, it dwindled to 0.02 mg/kg 24 hours later. Butter samples from a dairy products factory supplied from cows in an area under 21-day treatments had no detectable residues.
(R) Registered trade name

# BIOMETRY

A test statistic based on the von Neumann ratio was found to be suitable for testing the adequacy of within plot models in the analyses of sequential data. A simulation model has been developed to compare methods of supplementation to overcome pasture deficits on dairy farms. The "diallel cross" designs have been adapted to plant competition studies to examine competition between pairs of species and methods have been developed to estimate the spatial correlation among observations taken at points on a regular grid. Frequency squares orthogonal to the various types of 6x6 latin squares were generated. Manova and canonixal variate analysis were developed for analysis and interpretation of sequential multivariate data from grazing trials and remote-sensing studies.

# AGRICULTURAL ENGINEERING

Three computer programmes have been developed to assist in improving tractor, tillage implement and sowing equipment selection and management.

Development and acquisition of equipment for tillage research, including a tractor fuel consumption meter, continued. Some of this equipment was used in a field trial to compare the value of six commercially available treatments claimed to markedly increase the wear life of scarifier shares. In the prevailing conditions, one of the treatments was economically worthwhile.

Measurement of the uniformity of seed and fertilizer distribution by one conventional and two pneumatic sowing machines was completed. In all cases, the distribution is very uneven. A field trial to assess the effect of this variability on wheat yield has been prepared.

Construction and testing of a citrus air harvester has been successfully completed. The machine is currently being modified to improve its performance.

A ten-bin laboratory grain drier was built and tested.

New equipment developed for the Department's research staff included a seeder for cereal plot experiments, a semi-automatic pearlograph for cereal hardness testing, a chicken breast measuring instrument and a cash flow indicator for farm accounting.

Assistance was given in the design and preparation of specifications for air conditioned buildings to be erected at a number of research stations; these included a hatchery, three glasshouses, a mushroom house and five greenhouses for lucerne aphid research.

# ROYAL BOTANIC GARDENS

*Taxonomic Research*

The identification and classification of living things is an essential base for research and communication in both theoretical and applied biological sciences. Research in systematics at the National Herbarium is dependent on both well-curated plant collections and an efficient library. The aim of the research in the Herbarium is to study and understand the identity and relationships of native and introduced plants within New South Wales and to place the knowledge gained into the appropriate Australian and world-wide perspective. To achieve these aims it is necessary to conduct complementary studies at various levels in the taxonomic hierarchy.

*Revisions*

Revisionary studies are basically concerned with plant species, their identity, description and relationships with other closely related species. A revision of Tremandraceae was published last year and manuscripts in various stages of preparation and publication include a new fern genus *(Coveniella)*, some *Acacia* species, *Conospermum, Crotalaria,* a new genus in the family Rutaceae *(Neobyrnesia), Zostera* and several genera in the Solonaceae. Considerable progress has been made in studies on the genera *Eucalyptus, Leucopogon, Grevillea, Zieria, Livistona, Cyperus, Juncus, Acacia,*

*Casuarina* and *Glycine.*

*Systematic Studies above the Species Level*

Studies on the relationships between genera and between families have continued, utilising a large range of techniques. One paper has been published on the ultrastructural and anatomical characters of the Cyperaceae and several other manuscripts are in various stages of publication or preparation including:

- A study of inflorescences and of the supra-generic classification of the large family Myrtaceae. This investigation has led to re-assessment of the relationships of a considerable number of genera and reappraisal of many of the concepts involved in the description and comparison of inflorescence structures. For the first time for over 70 years, a listing is provided of all genera recognized within the family; the last comprehensive, worldwide, listing was so out-of-date that it included only about half as many genera as are now recognized within the family.

- A resume of the evolution, history, and adaptive features of the three families Myrtaceae, Proteaceae, and Restionaceae has been completed. Each of these families is important in the Australian flora and is of considerable biological and phytogeographic interest.
- An evaluation of ultrastructural and anatomical variations in the order Chenopodiales as an aid to interpret the various relationships within this agriculturally important group of plants has been completed.
- A cytological survey of Australian ferns is approximately half completed.

*Miscellaneous*

The manuscript for a census of angiosperms, gymnosperms and cycads of New South Wales is nearing completion and should be finished within the next financial year.

The phytochemical surveys of *Acacia* and *Lastreopsis* continued.

A paper has been published on some historically and taxonomically important algal collections held at the National Herbarium.

*Ecology*

Ecologists based at the National Herbarium conduct studies on various scales between 40 sq m and 25 million ha all aiming to provide a background framework of vegetation studies to which other research can be related.

*Survey and Mapping*

A vegetation map of Lord Howe Island is complete and is now being prepared for publication. Preparation of the 1:1 000 000 vegetation map of northwest New South Wales for publication is continuing. Mapping of the Cumberland Plain area is progressing and a publication has been produced on some aspects of the vegetation and soils of the region.

*Regeneration Studies*

Monitoring of sites continued at Mosman and Lord Howe Island for studies of regeneration after fire and natural plant invasions. Manuscripts are in preparation in both cases. The fire regeneration studies at Mosman clearly indicate the lack of suitable management policies for small areas of bushland. The studies at Lord Howe Island have been beneficial in indicating changes in management for the island's main primary industry of harvesting palm seeds.

*Plant Community Studies*

Data gathering and experimental work on plant communities in an area of the South Coast ranges have been completed and a manuscript is in an advanced stage.

*Algal Ecology*

Studies on blooms of toxic algae have continued and a Departmental Technical Bulletin produced on this subject. Investigations of epiphytic algae growing on seagrasses are being maintained and a paper is about to be published. The epiphytic algae are a major food source for the many species of young fish that use the seagrass beds as a nursery area.

## MARKETING AND ECONOMICS

*Submissions to Inquiries*

Investigations of the economic aspects of wheat stabilisation arrangements and the economic structure of the citrus industry were undertaken and submissions presented to the Industries Assistance Commission inquiries into wheat stabilization and the citrus industry.

A survey of 200 producers throughout the State was undertaken and a report presented to the Dairy Industry Prices Tribunal.

The current economic situation and future prospects of the main industries in the N.S.W. rural sector were investigated and a report prepared for the special Inter-Departmental study group set up to examine the N.S.W. economy.

Divisional officers participated in a Commonwealth-State working party to develop and investigate alternative schemes designed to facilitate Stage II of the Industries Assistance Commission's proposals to reform the marketing of dairy products.

*Production Economics Research*

The Division continued to investigate the efficient use of resources by farmers in the production, harvesting and storage of commodities. Specific projects included:

- Economic evaluations of prune production under trickle irrigation at Young, passionfruit on the North Coast and apples in the Orange district.
- Various studies of the economics of farm machinery. These studies covered matching of machinery, running costs, methods of financing and possible replacement policies.
- Research into the potential for speciality carpet wool in Australia. Particular attention is being focussed on the Tukidale breed.
- Two studies of sheep production economics:
  - (i) an examination of the costs of production of prime lambs in the Oberon Shire and
  - (ii) a study aimed at determining whether the degree of skin fold development in merino sheep had any influence on sheep enterprise profitability.
- A study to determine the conditions under which continuous cropping in the Western Region is economically feasible.

As part of the Division's studies of the organisation of farm business and their growth, a joint project was undertaken with the University of New England to examine the nature of rural income and expenses in the wheat-sheep zone. A survey was conducted in the central Macquarie area with the particular aim of establishing causes and effects of fluctuating farm incomes.

*Farm Business Management*

A highlight of this work was the development of the "COMPLAN" model in co-operation with the Agricultural Business Research Institute of the University of New England. COMPLAN assists producers to determine the combination of enterprises best suited to their individual preferences and farm resource structure.

Assistance continued with the establishment of priorities for agricultural research by identifying problem areas in production and evaluating the costs and potential benefits of research. Studies of research programmes in durum wheat, rice, plague locust control, irrigated wheat, pasture improvement and poultry were carried out.

*Marketing and General Economics Research*

A range of investigations examining the marketing of agricultural commodities to identify ways of improving the efficiency of the price setting mechanism were conducted. Projects included:

- Studies to compare systems of market reporting which would increase the efficiency of compilation and dissemination of marketing information.
- Analysis of deficiencies in agricultural markets, models of alternative markets to handle bargaining power, the role of information in the marketing process and forms of government intervention.

Research continued into the problems of rural reconstruction and the financial position of those affected. Surveys in various areas of the State attempted to comprehend the extent of the problem. The present and future needs of hobby farmers were also considered in various areas of the State where there has been a large growth in the purchase and occupation of these farms.

Research into the possibilities of beef stabilization schemes and the introduction of carcase classification schemes was also continued.

Further progress was made on the development of a simulation model for use as an aid in decision making on the allocation of resources in animal disease control campaigns. The model is currently being used by veterinary officers responsible for planning the brucellosis eradication programme in N.S.W. Other States have expressed interest in using the technique for their own eradication programmes.

## EXTENSION RESEARCH

*Aspirations and Expectations of Sons of Farmers*

The study of the education and job plans of farmers' sons highlighted the disadvantages faced by rural/farm youth in the occupational choice process. It is suggested that career education in schools would be an effective solution to this problem.

*Evaluation of Regional Newsletters*

Preliminary results of surveys in southern N.S.W. to evaluate two regional newsletters indicated that farmers rated the newsletters very highly and found it difficult to be critical about them.

*Evaluation of Interaction Management Course*

A pretest of an evaluation of a training course for "first-line" supervisors was conducted. The evaluation aims to investigate changes in managerial style due to participation in the course.

# EXTENSION

## EXTENSION ADMINISTRATION

The clients of this Department include farmers, research workers, commercial firms, financial institutions, schools, colleges, universities, rural youth groups, adult rural groups, other government departments and consumers.

To effectively service this wide range of clients all divisions have located most of their officers in the country.

The Division of Extension Services provides the framework under which District Officers carry out their roles in extension, through decentralised regional administrative units, and district offices.

Support staff provided by the Division of Extension Services at regional headquarters and some district offices includes regional extension officers, extension officers, regional publicity officers, regional clerks and field assistants. Office staff and accommodation are administered by the Division, which also provides specialised staff and services at Head Office.

Other Divisions have specialist officers at regional headquarters and Head Office to support district officers. Veterinary staff also have an extension role but are outside the regional extension service.

*Support for Extension*

During the year many primary producers contributed land, facilities, machinery, livestock and labour towards demonstrations and other extension activities of this department. Manufacturers contributed fertilizers, chemicals, machinery and fencing material for similar purposes. Radio, television and print media gave generously of time and space to foster various extension activities.

*Australian Extension Service Grant 1977/78*

The Chief, Division of Extension Services is responsible for the administration of funds for extension and regional research made available by the Commonwealth Government through the Department of Primary Industry.

The total allocation in New South Wales from the Australian Extension Services Grant for 1977/78 was $2 443 766, an increase of 0.7 per cent over the previous year. The following table records the allocations for salaries, operating and capital, as well as the total allocations for the past three years.

| | Salaries | Operating | Capital | Total |
|---|---|---|---|---|
| 1977/78 | 1 625 183 | 655 202 | 163 381 | 2 443 766 |
| 1976/77 | 1 850 774 | 423 579 | 151 850 | 2 426 203 |
| 1975/76 | 1 623 556 | 317 774 | 249 383 | 2 190 713 |

Allocations to New South Wales from the Australian Extension Services Grant have been reduced significantly in real terms in recent years because the money increases have been well below the inflation rate.

During the period of rapid inflation salary payments were taking an excessive proportion of the total funds. In 1977/78 the number of positions financed from the Australian Extension Services Grant was reduced by 21, allowing a consequent increase in the proportion of funds devoted to operating and capital items. Items financed by AESG funds were grouped as projects that reflected the organisation of the Department. The following table compares allocations to those projects for the years 1975/76, 1976/77 and 1977/78.

| Project No. | Title | 1975/76 | 1976/77 | 1977/78 |
|---|---|---|---|---|
| 501 | Agronomy | 275 350 | 368 808 | 436 194 |
| 502 | Horticulture | 142 463 | 144 151 | 102 252 |
| 503 | Animal Industry | 162 196 | 185 677 | 123 357 |
| 504 | Dairying | 128 732 | 138 250 | 49 750 |
| 505 | Biometric Services | 20 000 | 20 000 | 25 000 |
| 506 | Extension Services | 589 793 | 727 885 | 727 613 |
| 507 | Engineering & Machinery Services | 130 666 | 147 904 | 201 500 |
| 508 | Agricultural Trainees | 8 050 | 4 000 | |
| 509 | Publications | 74 250 | 96 412 | 110 950 |
| 510 | Library Services | 30 000 | 34 500 | 50 000 |
| 511 | Training Study Tour Overseas | 3 500 | 12 000 | 30 000 |
| 514 | In-Service Training | 14 478 | 34 800 | 78 700 |
| 515 | Post Graduate Training | 2 000 | 2 000 | 39 000 |
| 517 | Economic & Market Services | 254 393 | 315 601 | 342 720 |
| 518 | Biological & Chemical Research | 120 668 | 144 215 | 126 730 |
| 520 | Buildings & Other Major Devel. | 236 883 | 50 000 | |
| | | 2 193 422 | 2 426 203 | 2 443 766 |

In October 1977 Standing Committee on Agriculture approved proposals for new priorities for expenditure of Commonwealth funds on extension and regional research, and recommended the proposals to the Australian Agricultural Council. The Australian Agricultural Council accepted the proposals and confirmed its acceptance in January 1978. However, by June 30th, 1978, the Commonwealth Government had not indicated its acceptance or otherwise of the recommendations from the Australian Agricultural Council. Instead the Commonwealth Minister for Primary Industry advised State Ministers that funding would be extended for a single year — 1978/79 under the title of Commonwealth Extension Services Grant, and at the same level in money terms as the 1977/78 grant.

| Extension Staff | North Coast | New England | Western | Central West | Southern | South West | South East and Illawarra | Mid Coast and Hunter | Total |
|---|---|---|---|---|---|---|---|---|---|
| Regional Director of Extension | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 |
| Regional Extension Officer | 1 | 1 | 1 | 1 | 1 | — | 1 | 1 | 7 |
| Field Assistant | 4 | 5 | 3 | 5 | 3 | 8 | 5 | 3 | 36 |
| Extension Officer | 3 | 3 | 1 | 3 | 1 | 2 | 3 | 4 | 20 |
| Research/Extension Liaison Officer | — | 1 | 1 | — | — | — | — | — | 2 |
| Regional Publicity Officer | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 |
| Italian Liaison Officer | — | — | — | — | — | 1 | — | — | 1 |
| Clerical Officer | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 23 |
| Stenographer and Typist (Inc. Casual) | 21 | 13 | 8 | 11 | 9 | 14 | 14 | 9 | 99 |
| Special/Assistant Principal Agronomist | — | 2 | 1 | 1 | — | 1 | 1 | — | 6 |
| District Agronomist | 5 | 8 | 6 | 6 | 4 | 9 | 7 | 4 | 49 |
| Agronomist | — | — | — | — | — | — | — | | — |
| Research District/Agronomist | — | — | — | — | — | — | — | 1 | 1 |
| Field Officer (Weeds) | — | 1 | 1 | 1 | — | 1 | — | — | 4 |
| Seed Production Officer | — | 1 | 1 | 1 | 3 | — | — | — | 6 |
| Tobacco Officer | — | 2 | — | — | — | — | — | — | 2 |
| Special Livestock Officer (Sheep and Wool) | — | 1 | — | 1 | — | — | 1 | — | 3 |
| Livestock Officer (Sheep and Wool) | — | 5 | 6 | 4 | 3 | 4 | 3 | — | 25 |
| Livestock Officer (Beef Cattle) | 3 | 4 | 1 | 2 | 3 | 2 | 3 | 2 | 20 |
| Livestock Officer (Pigs) | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 11 |
| Livestock Officer (Poultry) | — | 1 | — | — | — | — | — | 4 | 5 |
| Livestock Officer (Apiculture) | — | 1 | 1 | — | — | — | — | — | 2 |
| Livestock Officer (Sheep Fertility Service) | — | — | — | — | 1 | — | — | — | 1 |
| Principal Horticulturist | 1 | — | — | — | — | — | — | — | 1 |
| Special Horticulturist | — | — | — | — | — | 1 | — | — | 1 |
| District Horticulturist | 6 | 1 | 1 | 3 | 1 | 8 | 2 | 6 | 28 |
| Supervising Inspector (P.D. Act) | 1 | — | — | 1 | — | 1 | — | — | 3 |
| Inspector (P.D. Act) | 8 | 4 | 1 | 4 | 3 | 14 | 2 | 7 | 43 |
| District Dairy Officer | 5 | — | — | — | 1 | 1 | 2 | 2 | 11 |
| Dairy Officer | 4 | — | — | — | — | — | 2 | 3 | 9 |
| Livestock Officer (Dairy Cattle) | 3 | — | 1 | — | — | 1 | 1 | 3 | 9 |
| Dairy Project Officer | — | — | — | — | — | — | — | — | — |
| Herd Organiser | — | — | — | — | — | — | — | 1 | 1 |
| Herd Recorder | 9 | — | — | — | 1 | 1 | 11 | 16 | 38 |
| Agricultural Mechanisation Officer | 1 | 1 | 1 | 1 | 1 | 1 | 1 | — | 7 |
| Economist | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 2 | 16 |
| Field Recording Officer | — | 1 | — | — | — | — | — | — | 1 |
| Locust Patrol Officers | — | — | 1 | — | — | — | — | — | 1 |
| Market Officer | — | — | — | — | 1 | — | — | — | 1 |
| Total | 83 | 66 | 43 | 54 | 44 | 78 | 66 | 75 | 509 |

# EXTENSION PROGRAMMES

## (a) NATIONAL AND STATE PROGRAMMES

*Grain Pest Control*

The Department's Grain Pest Campaign moved into a phase of direct action at the farm level. With the co-operation of the Grain Elevators Board of New South Wales, properties were identified from which deliveries of insect pest infested wheat had been made. These properties were visited by Departmental Inspectors and clean-up operations undertaken as directed. The initiation of the regulatory aspects of the campaign was aided by favourable seasonal conditions, which reduced the incidence of grain pests and by the combined use in central storages of fenitrothion and synergised pyrethrins. The introduction of new insecticides has enabled considerable cost savings.

*Brucellosis*

The main extension activity of veterinary staff continued in support of the National Brucellosis Eradication Campaign. Major expansion of the test and slaughter phase of the campaign during the year resulted in increased extension activity in a number of districts.

A movie film was produced for extension. Regional officers assisted with training courses and in mass media campaigns. This involved mass media, group and individual extension. One district reported that at the commencement of the campaign circular letters, including brucellosis extension leaflets, were mailed to some 7 000 owners with registered tail tag numbers.

Particularly valuable extension followed the personal contact made by staff when visiting individual properties of which some 30 per cent were infected herds.

*Livestock Market Reporting Service*

This campaign was the first campaign conducted with financial backing from A.E.S.G.

Officers were briefed on the system and the extension methods before the scheme was introduced.

The service introduced at Homebush in June 1977 was extended to cover sales at Wagga in February, 1978.

The documented aim of this programme was to achieve 50 per cent adoption of the objectives in the first 18 months of extension input. This time will arrive by December, 1978.

Reports and regional discussion indicate that awareness of the system is near 100 per cent.

Adoption of the system in practice by private reporters is estimated to be 25-30 per cent.

*Mastitis Control*

The mastitis control programme has as its basis the monthly bulk milk somatic cell count carried out, in conjunction with the Dairy Industry Authority, on every dairy herd in N.S.W. Each farmer receives a printout slip which includes the previous five counts, the farmer's rating within his factory group, and an estimation of his production loss due to mastitis.

The Mastitis Advisory Service then involves follow-up advice at the district level by means of individual visits, field days, etc., in co-operation with local veterinary officers and or drug firms as may be appropriate. Individual cow somatic cell counts are being used as another diagnostic tool in studying mastitis problem herds.

The State average somatic cell count for the year was 554 000 per millilitre, corresponding to an estimated milk production loss to the State of about 1 000 000 litres per week during peak production.

Agreement has been reached to provide veterinary practitioners with the results of somatic cell counts from clients who nominated them. This aimed to involve practitioners more actively as members of the team servicing the industry.

*Carcase Classification*

In conjunction with officers of other State Departments and the Australian Meat and Livestock Corporation, Departmental officers contributed to the preparation of

films, audio-visual aids and written material explaining the procedures of carcase classification. Two livestock officers were on full-time duty as field supervisors of pilot trials of semi-automated carcase classification equipment. Officers participated in manual pig carcase classification at two abattoirs. At one of these State meat inspectors monitored 14 post-mortem conditions which were recorded on weight sheets for distribution to producers. Manual methods of beef and sheep carcase classification were investigated.

Officers of the beef and sheep sections were involved in meetings, seminars and workshops with the Australian Meat and Livestock Corporation and other organisations working towards the implementation of classification in New South Wales abattoirs.

This Department co-operated with other State Departments of Agriculture in undertaking pilot runs of the proposed Pig Carcase Measuring and Information Service. Officers assisted in assessing the impact of the pilot runs on pig producers, stock buyers and processors involved. Extension was to all sections of the trade.

*Pasture Legume Aphid*

Following the outbreak of Spotted Alfalfa Aphid (S.A.A.) and the Blue Green Aphid (B.G.A.) a statewide extension and research effort was commenced.

The majority of producers are aware of the pests and can identify them. Most new lucerne sowing are with tolerant/resistant varieties. Woolly pod vetch has been sown as an alternative.

District Agronomists in the autumn of 1978 have sown 70 comparative lucerne variety demonstrations.

Research has comemnced on eight trials around the state to evaluate varieties and a lucerne breeding programme.

Two research officers travelled overseas to obtain data to assist in combating the problem in N.S.W.

A number of predators on both S.A.A. and B.G.A. have been released throughout the state.

*Exotic Disease*

A major exotic disease control exercise was conducted at Armidale. It was attended by some 120 Departmental staff and interstate observers to demonstrate the principles of exotic disease control administration. This provided the opportunity for extensive radio, television, newspaper and face-to-face extension on exotic diseases in the north of the State. This followed a similar exercise in the south last year. Farmer meetings highlighted the cost of exotic disease and the disruption to community life which inevitably ensues.

State-wide mass media publicity was given on the occurrence in New South Wales of contagious metritis of mares, equine herpes virus abortion of mares and of bluetongue virus in Northern Territory.

*Livestock (Chemical Residues) Act*

Veterinary staff have particular responsibility under this Act and have been active in extension where the main thrust has been towards ensuring "good agricultural practice". This Act is complementary to the Pesticides Act.

*Pesticides Act 1978*

Following the introduction of the Pesticides Act 1978, seminars were held in country centres for departmental staff, retailers, wholesalers and pesticide appliers.

Press articles and radio talks have been given in a public awareness campaign to inform all who store, sell or use pesticides of the provisions of the new Act. Articles have regularly appeared in regional bulletins.

*Dairy Herd Improvement Programme*

The State's re-organised dairy herd improvement programme which commenced in 1974 has continued to develop satisfactorily. The programme consists of a bull breeding (Sire Evaluation Plan) and progeny testing scheme for the Friesian and A.I.S. breeds.

Planning is in an advanced stage to commence a joint scheme for the Jersey breed with the Queensland Department of Primary Industries in which the cattle population of both States will be combined. The success of this Scheme could promote the basis from which the proposed National Dairy Herd Improvement Scheme will develop.

*Dairy Product Quality Assurance*

The continuing State programme this year involved the taking of 1 406 samples on which 5 237 chemical and 4 762 microbiological tests were carried out.

The results are reported to District Officers for advice and action with the particular factory as necessary.

In addition, a total of 575 586 (25 kg) boxes of butter and 6 578 (19 kg) of cheese were graded organoleptically and grade certificates were issued to the factories and to Dairy Officers to enable them to carry out follow-up extension.

*Objective Measurement*

A fleece measurement service is operating from Trangie Agricultural Research Station. This service in the last 18 months has processed 8 000 wool samples from 66 studs. The information includes greasy fleece weight, greasy fleece ranking and a fibre diameter classification, which assists in the selection of reserve sires and in the grading of flock rams for sale. There is a trend towards on-property stud sales using the measurement information and to date four such sales have been held.

*Meat Marketing*

A meat marketing group was formed to provide training in marketing for seven district livestock officers and one agricultural economist. It aims at better equipping these officers to conduct extension programmes in marketing for the livestock and meat industries. The course runs for two years in addition to normal duties and each officer is to carry out both an academic marketing project and a field project involving a part of the meat industry.

An advisory panel has been established to provide guidance to members of the group. It is made up of some of the leading marketing people in the Australian meat industry.

Both programmes sought to motivate producers to implement well planned initiatives in marketing designed to improve producer income.

*Objective Clip Preparation*

An extension programme was undertaken including 36 small work shops throughout the State with an attendance of over 700 producers. It is estimated that now over 50 per cent of the New South Wales pre-sale tested wool clip is prepared objectively.

*Pork Promotion*

The National pig meat promotion committee is promoting pork cuts derived from a heavier carcase weight pig termed a "Super Porker". Retail sales in Melbourne showed that these new pork cuts were rapidly accepted.

The Principal Livestock Officer (Pigs) is State Co-ordinator of the promotion programme and extension activities were directed towards producers in the trade relating to the "Super Porker". Whilst there are obvious advantages to the producer in this concept, there is a need for a careful economic evaluation as well as an assessment of the acceptance by the retail trade and the consumer.

*Electric Fencing*

Agricultural mechanisation officers throughout the State have undertaken work on electric fencing to further reduce fencing costs, to evaluate the insulation properties of treated hardwood posts, to test types of insulators and the performance of solar energisers. They have erected demonstration fences and conducted fencing demonstrations, field days and schools to encourage farmers to adopt electric fencing.

## (b) REGIONAL AND DISTRICT PROGRAMMES

| Subject Area | Number of Programmes |
|---|---|
| Production | 531 |
| Farm Business Management | 69 |
| Marketing | 53 |
| Regulatory | 17 |
| Environmental and Consumer Protection | 17 |
| Community Development | 15 |
| Programmes for Youth | 27 |
| Other | 139 |

## OTHER EXTENSION ACTIVITIES

*Regional Extension Services*

Farm Visits

| | |
|---|---|
| 1 visit | 10 490 |
| 2 visits | 2 888 |
| 3 visits | 1 470 |
| 4 or more visits | 2 254 |
| Total number of farmers visited at least once | 17 100 |

Group Extension (Excluding Rural Youth)

| | Total | Attendance |
|---|---|---|
| Field Days | 1 009 | 53 694 |
| Meetings | 1 332 | 36 340 |
| Courses, schools | 154 | 7 990 |

Summary of Mass Media Output

| | |
|---|---|
| Articles for the Agricultural Gazette | 38 |
| Articles for dairy topics | 35 |
| Articles for statewide journals and magazines | 80 |
| Press articles (original) | 2 992 |
| Radio Broadcasts (original recordings) | 2 671 |
| TV programmes (original) | 124 |
| Issues of regional and district newsletters | 209 |
| Joint papers and articles with research workers | 26 |
| Regional or local bulletins or pamphlets (no. of titles) | 186 |
| Contributions to Research/Extension liaison conferences | 102 |

Veterinary Services

| | |
|---|---|
| Property visits | 14 055 |
| Press releases | 511 |
| Contributions to newsletters | 165 |
| Radio broadcasts | 158 |
| TV programmes | 25 |
| Addresses to meetings | 207 |
| Field day sessions | 69 |

Rural Youth

| | |
|---|---|
| Number of Rural Youth Clubs | 159 |
| Total Junior Membership | 2 917 |
| Total Senior Membership | 467 |
| Number of meetings, field day schools, etc. | 1 208 |
| Total attendance at educational activities | 19 737 |
| Total attendance at social functions | 5 797 |
| Total attendance at organisational functions | 4 867 |
| Total farm or home visits by Rural Youth Officers | 1 559 |

Agricultural Bureau

| | |
|---|---|
| Number of Agricultural Bureau Branches | 65 |
| Total membership | 2 091 |

## RURAL YOUTH ORGANIZATION AND AGRICULTURAL BUREAU OF N.S.W.

Appointments of Extension Officers has led to:—

better servicing of existing Rural Youth Clubs and Agricultural Bureau Branches, a renewal of some branches; programmes of analysis to determine potential for the formation of new groups; introduction of new programmes including leadership training courses.

*Rural Youth*

*Farm Management Course*

Record enrolments of 74 students in Year I resulted from an extensive promotion of the Course in late 1977. A record carry-over of students to Year II is anticipated.

Co-operation of staff of the University of New England in lecturing in the various aspects of the Course was readily forthcoming. Farm Case studies were organised in the Central West for Level II and III students.

*Farm Office Management Course*

Again there was a record enrolment of students (124) in 1978.

The Course was modified from two years to one year and the response has been enthusiastic.

A grant of $500 was received from the Board of Adult Education for the revision of Course notes.

*Agricultural Bureau*

Close liaison continued between the Department and the Agricultural Bureau of N.S.W.

Activities were held throughout the state at which officers contributed technical and other assistance.

The Beef Cattle Breeders Competition jointly sponsored by the Agricultural Bureau, the Rural Bank and the Department of Agriculture was revised and successfully conducted across the state.

## (a) EXTENSION PUBLICATIONS

The Division of Extension Services processed about 450 different publications, and distributed about 340 000 copies. A few publications were for sale, but the vast majority were free to farmers and home gardeners.

The *Agricultural Gazette of New South Wales* was issued during the nominal month of publication or just before, an improvement on previous years. Quality of articles and presentation also improved. The quarterlies *Dairy Topics* and *Poultry Notes,* however, were sometimes late through printing delays and staff shortages.

The farmer bulletin series of over 1 000 titles continued unchanged, but there were some delays caused by the new pesticides legislation.

Extensive use was made of a new "Information" letterhead on foolscap paper, designed for offset-printed publications both at Head Office and other centres. The speed, convenience and versatility of offset printing will be further exploited when further equipment becomes available.

The *Technical Bulletin* series began in 1974 as an additional outlet for research publications; published No. 19 in June. It is clear that the series is serving a useful purpose.

## (b) AGRICULTURAL ECONOMICS PUBLICATIONS

The Review of Marketing and Economics publishes research material from a wide range of sources being a premier professional journal. Three editions of the journal were published this year. The continued publication of the Review is currently being reassessed in the light of staff restrictions.

The monthly Commodity Bulletin publishes commodity outlook material and general extension material with a state-wide application. It has continued to be published on a monthly basis.

Miscellaneous bulletins published on an irregular basis contain research material produced by officers of the Division. Some five editions were published in the year under reference.

Weekly Marketing Notes publish weekly reports of the market reporting activities of the Division. Some 1 200 copies are regularly distributed.

## HOME GARDEN ENQUIRIES

Total enquiries for the past years were:

| | |
|---|---|
| 1973-74 | 12 990 |
| 1974-75 | 16 692 |
| 1975-76 | 16 412 |

Enquiries for the year 1977-78 were as follows:

| | |
|---|---|
| Telephone | 15 626 |
| Postal | 792 |
| In-person | 2 750 |
| Field officers | 180 |
| | 19 348 |

The two officers presented nine lectures to garden clubs, horicultural societies and Agricultural Bureau, and visited gardens and nurseries in the metropolitan area. They also revised some existing publications, contributed an article to the Agricultural Gazette, and prepared material for Departmental bulletins.

### LIBRARY SERVICES

The technical library service comprises collections under the care of librarians at the head office library, the Royal Botanic Gardens, the Biological and Chemical Research Institute, the Veterinary Research Station, the three agricultural colleges and the five research centres at which regional directors of research are located.

Other material is stored at regional extension headquarters, district offices, and research stations throughout the state.

The library exists to inform officers of new developments in their field of expertise, to obtain information that they specify and to assist in staff development.

*Current Awareness*

Some 1 000 periodical titles are received by subscription, donation or exchange and these are circulated to individuals and research stations.

A Library Bulletin is published 10 times a year and it notifies items newly received ranging from books to pamphlets, annual reports and new periodicals. Each issue lists approximately 420 items.

*Reference and Research*

Literature searches are carried out upon request but generally research workers prefer to do their own. Reference queries number in the thousands some of which result in many loans being sought and photocopies obtained.

It has been decided to set up a core collection of journals with elements of bibliographic control at the research stations. The core collection will supply quickly items requested by researchers and thus support work going on at the more isolated research stations.

Computer terminals will be used to assist by accessing data leases at C.S.I.R.O. and the National Library. The central library maintains a union catalogue and plans are in hand to make this available to all research centres.

*Education and Staff Development*

Libraries at the agricultural colleges have their own funds but access to the wider technical library service greatly increases their usefulness.

Staff development is encouraged by the library holding material of general interest and by obtaining references required by staff in their educational programme.

## REGULATION AND TECHNICAL SERVICES

### REGULATORY FUNCTION OF THE DEPARTMENT

The enforcement and implementation of statutory provisions is the function of Government. As such the New South Wales Department of Agriculture has a basic function in the

- control or eradication of plant and animal diseases
- ensuring quality standards in respect of agricultural products especially foodstuffs and aids such as stock medicines, pesticides, etc.
- standards of conduct in areas of activity associated with agriculture.

These powers and responsibilities are vested in the Department through various Acts and their Regulations.

Some officers perform regulatory activities together with other responsibilities. In addition particular groups are appointed for specific regulatory functions, e.g., meat inspection, cattle tick control, brucellosis eradication, plant disease regulation, and quarantine for import and export.

Regulatory work is a major activity in three Divisions of the Department as indicated in the following section.

The Legal Section is consultation with relevant Divisions prepares legislation including amendments to existing statutes, prepares informations for prosecutions and appears on behalf of the Department in defended cases.

## REGULATORY STAFF

The following table summarizes Departmental staff who are inspectors under an Act and who are directly involved in regulatory work. Many of the professional staff have a dual regulatory/extension function.

**DEPARTMENTAL REGULATORY STAFF AS AT 30th JUNE, 1978**

| | Central Administration (Pesticides) | Animal Industry | Dairying | Horticulture | Plant Industry | Total |
|---|---|---|---|---|---|---|
| Professional | 3 | 61 | 26 | 33 | | 123 |
| Inspectors | | 1109 | | 144 | 4 | 1257 |
| Total | 3 | 1170 | 26 | 177 | 4 | 1380 |

## SUMMARY OF REGULATORY ACTIVITIES

Activities are listed under the following main Acts administered by the Department:—

*State Acts*

Agricultural Holdings Act, 1941; Agricultural Seeds Act, 1921; Apiaries Act, 1916; Cattle Compensation Act, 1951; Dairy Industry Act, 1915; Farm Produce Agents Act, 1926; Fertilizers Act, 1934; Horticultural Stock and Nurseries Act, 1969; Meat Industry Act, 1915; Noxious Insects Act, 1934; Pastures Protection Act, 1934; Pest Destroyers Act, 1945; Pesticides Act, 1978; Plant Diseases Act, 1924; Potato Growers Licensing Act, 1940; Poultry Processing Act, 1969; Pure Foods Act, 1908; Registration of Stock Brands Act, 1921; Stock (Artificial Insemination) Act, 1948; Stock (Chemical Residues) Act, 1975; Stock Diseases Act, 1923; Stock Foods and Medicines Act, 1940; Swine Branding Act, 1940; Swine Compensation Act, 1928; Veterinary Surgeons Act, 1923.

*Commonwealth Acts*

Quarantine Act, 1908; Customs Act, 1901; Commerce (Trade Descriptions) Act, 1905.

The following general activities were undertaken under the abovementioned Acts:—

Prosecutions, 307; Proclamations, 54; Notifications, 33, and Gazettal of appointments, etc., 63.

*Agricultural Holdings Act, 1941*

Disputes referred to Agricultural Committees, 4.

*Agricultural Seeds Act, 1921*

Seed samples collected, 135; Prosecutions, 2.

*Apiaries Act, 1916*

Restrictions were placed on the movement of bees and apicultural products in southern New South Wales following the discovery, for the first time in this state, of European foul brood disease.

Prosecutions, 9.

*Cattle Compensation Act*

Compensation was paid for 23 389 cattle ordered to be destroyed on account of suspected disease and 54 carcasses condemned during meat inspection. The dramatic increase in cattle ordered to be slaughtered was due to brucellosis. The diseases on which claims were paid follow:

| Disease | Claims | Cattle and carcasses |
|---|---|---|
| Brucellosis | 397 | 22 605 |
| Johne's disease | 2 | 4 |
| Tuberculosis | 136 | 824 |
| Tick fever | 1 | 1 |
| Trichomoniasis | 1 | 9 |
| Total | 537 | 23 443 |

*Dairy Industry Act*

| | |
|---|---|
| Dairy factories registered | 78 |
| Dairy produce stores registered | 175 |
| Dairy factory and store inspections | 689 |
| Remedial orders issued | 56 |
| Certificates of competency issued — Milk grading | 36 |
| — Cream grading | 0 |
| — Milk testing | 18 |
| — Cream testing | 10 |
| — Cheesemaking | 2 |
| — Buttermaking | 1 |
| Butter analyses — Moisture | 211 |
| — Salt | 206 |
| Ship stores certificates issued | 150 |

Cheesemaking certificate numbers were down on last year due to the commencement of the new uniform syllabus required in the South Australian theory course. Butter manufacture declined dramatically, resulting in fewer candidates for cream grading and buttermaking.

*Farm Produce Agents Act*

| | |
|---|---|
| Registration of farm produce agents | 240 |

*Fertilizers Act*

| | |
|---|---|
| Fertilizers sampled for analysis | 10 |
| Survey of blood and bone type fertilizers | 33 |

*Horticultural Stock and Nurseries Act*

| | |
|---|---|
| Registrations — nurserymen | 2 130 |
| — resellers | 2 411 |
| Inspections — nurseries | 2 349 |
| — resellers | 1 939 |

*Meat Industry Act, 1915*

The State Meat Inspection Service carried out anti-mortem and/or post mortem inspections of livestock at 29 export establishments, at 7 non export abattoirs and at an increasing number of slaughterhouses throughout the State.

| Inspections | Carcasses and Viscera |
|---|---|
| Adult cattle | 3 295 779 |
| Calves | 464 019 |
| Sheep | 8 557 335 |
| Pigs | 1 075 791 |

The above includes inspections under the Commerce (Trade Descriptions) Act (Commonwealth).

Re-Inspections of Meat after introduction into the metropolitan abattoir area from other States and New Zealand.

| | Carcasses |
|---|---|
| Beef | 912 927 |
| Calves | 404 917 |
| Sheep | 2 340 273 |
| Pigs | 500 280 |
| Goats | 13 |
| Piece meats (kg) | 12 769 375 |

*Pastures Protection Act, 1934*

Sodium fluoracetate (1080) is only available for the destruction of vertebrate pests declared noxious under this Act. The use of 1080 for wild pig destruction was authorized by the Director-General of Agriculture for 37 pastures protection boards. Pastures protection boards and dingo destruction boards required Ministerial approval for aerial baiting with 1080 for wild dog control. Approval was given for 15 separate drops.

Rabbit control is administered by the Department and organized by pastures protection boards.

Prosecutions under this Act were undertaken by pastures protection boards in their own right.

*Pest Destroyers Act, 1945*

During 1977/8 2 066 applications were received for 444 new products, 499 applications to amend existing labels and 1 123 annual re-registrations for products marketed.

Investigations of nine offences were undertaken.

*Pesticides Act, 1978*

This was introduced to replace the Pest Destroyers Act. The latter was inadequate to cope with the changed techniques in agriculture over recent years and for dealing with the massive use of pesticides in agriculture and in other situations.

The objects of the Pesticides Act are to:

1. Provide for the registration of pesticides, the approval of containers (for registered pesticides), and the registration of labels.
2. Control the sale, supply, use and possession of pesticides.
3. Prevent certain foodstuffs containing prohibited pesticide residues from becoming available for consumption or export.

Departmental staff and industry were briefed on their responsibilities under the Act. It will become operative on the promulgation of the regulations in the new financial year.

*Plant Diseases Act*

Inspections in districts —

| | |
|---|---|
| Orchards, plantations, vineyards | 10 971 |
| Statistics only | 1 052 |
| Fruit shops and stalls | 3 706 |
| Home gardens | 31 459 |
| Grain storages | 565 |
| Notices issued pest and disease control | 516 |

Inspections at markets —

Detention notices issued for noncompliance with grading, packing or labelling regulations —

| | Packages |
|---|---|
| Apples | 23 002 |
| Pears | 17 894 |
| Citrus | 11 328 |
| Grapes | 3 591 |
| Bananas | 1 787 |
| Tomatoes | 4 790 |
| Rockmelons | 2 266 |
| Potatoes | 28 951 |

Prosecutions:

| | |
|---|---|
| All successful | 47 |

*Potato Growers Licensing Act*

| | |
|---|---|
| Registrations — potato growers | 874 |
| Inspections of properties | 357 |

*Poultry Processing Act*

The 98 registered poultry processing plants were inspected regularly.

Prosecutions:

Five plants were successfully prosecuted for excess water uptake in frozen poultry.

*Pure Food Act*

The Department in conjunction with the Health Commission of New South Wales inspected all New South Wales milk drying plants following the detection of Salmonella in dried milk products in Victoria. Salmonella was not detected in samples tested.

Prosecutions:

| | |
|---|---|
| For offences relating to transportation of meat | 37 |

*Registration of Stock Brands Act*

| | |
|---|---|
| Registration of brands for large stock totalled | 1 858 |
| Registration of sheep ear marks, colour brands and fire brands totalled | 2 209 |

*Stock (Artificial Insemination) Act*

Artificial insemination of cattle declined further leaving only two artificial breeding centres registered in N.S.W. at 30th June, 1978. Semen import from overseas totalled 15 429 of which 3 842 were rejected being below the specified quality.

Certificates of Competency under the Act were issued to 12 persons for the insemination of cows.

*Stock (Chemical Residues) Act*

The residue epidemiological case study was extended in 1977/8 to the sampling of cattle at 19 abattoirs throughout the state. When the maximum residue limit (MRL) was exceeded action was taken to detain stock on the property of origin. The table shows that of the 8 649 fat samples analysed 79 per cent were free of all residues and that only 0.6 per cent were above the actionable level.

Pesticide Residue in Samples from N.S.W. Cattle 1977/78

| Residue | MRL (ppm) | Number of Samples | | | |
|---|---|---|---|---|---|
| | | Above 100% | 50-100% | Below 50% | Total |
| DDT | 5.0 | 13 | 12 | 1 679 | 1 704 |
| Dieldrin | 0.2 | 38 | 12 | 75 | 125 |
| Heptachlor epoxide | 0.2 | 4 | | 7 | 11 |
| HCB | 0.5 | | | 1 | 1 |
| No residue | | | | | 6 808 |

The number of properties detained varied as new ones were added and others were released after residues in the cattle on the property dropped to acceptable levels. Seven properties (four DDT; three dieldrin) remained under detention orders at 30th June, 1978.

*Stock Diseases Act, 1923*

Regulatory activity in the control of brucellosis and tuberculosis in cattle is summarized in the standard format adopted for the National Brucellosis and Tuberculosis Eradication Campaign.

Bovine Brucellosis for New South Wales — Residual Area

| | |
|---|---|
| Number of herds | 68 658 |
| Number of dairy herds | 3 958 |
| Number of breeding animals | 5 254 838 |

Monitoring —

- Meatworks —

| | |
|---|---|
| Number of females slaughtered | 1 484 043 |
| Number of bulls slaughtered | 73 969 |
| Number of blood samples tested | 483 124 |
| Number of confirmed reactors | 12 576 |
| Percentage of confirmed reactors | 2.6 |
| Number of herds tested from meatworks traceback | 394 |
| Number of herds in which reactors were found | 2 364 |

- Milk Ring Testing (MRT) —

| | |
|---|---|
| Number of herds checked | 3 965 |
| Number of herds positive to MRT | 829 |
| Number of herds blood tested due to positive MRT | 285 |

- Abortion Investigations —

| | |
|---|---|
| Number of herds investigated | 203 |
| Number of positive investigations | 42 |

- Field Testing (6 per cent, or Routine, or Sample) —

| | |
|---|---|
| Number of herds tested | 2 420 |
| Number of cattle tested | 63 273 |
| Number of reactors | 1 805 |
| Number of herds tested from traceback, all origins | 821 |

● Total Monitoring —

| | |
|---|---|
| Number of herds tested | 3 241 |
| Number of herds positive | 1 322 |
| Number of cattle tested | 558 551 |
| Number of reactors | 15 997 |

Eradication —

| | |
|---|---|
| Number of infected herds during year | 9 375 |
| Number of herds tested during year | 16 207 |
| Number of cattle in infected herds | 499 402 |
| Number of blood samples tested | 2 334 208 |
| Number of reactors | 25 438 |

Disposal of Reactors —

| | |
|---|---|
| Number of reactors detected | 28 193 |
| Number of reactors slaughtered | 27 833 |
| Number of reactors for which compensation paid | 21 634 |
| Net compensation paid ($) | 1 241 460 |

Vaccination —

| | |
|---|---|
| Number of cattle vaccinated with Strain 19 | 454 804 |
| Number of herds vaccined with Strain 19 | 14 111 |
| Number of doses of Strain 45/20 used | 304 |
| Number of herds vaccinated with Strain 45/20 | 21 |

Laboratory —

| | |
|---|---|
| Number of blood samples tested | 3 255 793 |
| Number of serological tests | 3 811 524 |
| Number of bacteriological accessions | 89 |

Infection Data —

| | |
|---|---|
| Number of herds infected at beginning of year | 8 984 |
| Number of cattle in infected herds at beginning of year | 1 077 827 |
| Number of herds infected at end of year | 6 949 |
| Number of cattle in infected herds at end of year | 1 032 514 |

Prevalence (per cent) —

| | |
|---|---|
| Herd | 10.1 |
| Individual | <1.3 |

Bovine Tuberculosis for New South Wales — Provisionally Free Area

| | |
|---|---|
| Number of cattle herds | 68 982 |
| Number of cattle | 8 915 714 |

Monitoring —

● Meatworks —

| | |
|---|---|
| Number of cattle slaughtered | 3 295 779 |
| Number with TB lesions (presumed plus confirmed) | 120 |
| Number of successful tracebacks to herd of origin | 115 |
| Percentage of successful tracebacks | 95.8 |

● Testing —

| | |
|---|---|
| Number of cattle tested | 24 091 |
| Number of reactors | 62 |
| Total number of herds tested | 345 |
| Number of herds confirmed infected | 5 |
| Number of herds tested from meatworks traceback | 82 |

Eradication —

| | |
|---|---|
| Number of infected herds | 151 |
| Number of herds tested | 192 |
| Number of cattle in infected herds | 69 909 |
| Number of individual cattle tests | 85 988 |
| Number of reactors | 438 |

Disposal of Reactors —

| | |
|---|---|
| Number of reactors detected | 500 |
| Number of reactors slaughtered | 495 |
| Number of reactors autopsied (meatwork and field) | 495 |
| Number of reactors with lesions | 270 |
| Number of reactors for which compensation paid | 716 |
| Number of casual cases for which compensation paid | 54 |
| Net compensation paid ($) | 58 398 |

Laboratory —

| | |
|---|---|
| Number of bacteriological accessions | 331 |
| Number with confirmed tuberculosis | 231 |

Infected Data —

| | |
|---|---|
| Number of herds infected at beginning of year | 67 |
| Number of cattle in infected herds at beginning of year | 46 081 |
| Number of herds infected at end of year | 62 |
| Number of cattle in infected herds at end of year | 22 752 |

Prevelance (percentage) —

| | |
|---|---|
| Herd | 0.09 |
| Individual | 0.0008 |

Quarantine was applied for the following diseases:

| Disease | Quarantined Properties | Stock |
|---|---|---|
| Anthrax | 28 | 30 465 |
| Lice in Sheep | 834 | 1 167 711 |
| Ked in Sheep | 10 | 6 686 |
| Lice and Ked in Sheep | 3 | 335 |
| Tuberculosis in Cattle | 151 | |
| Tuberculosis in Pigs | 3 | |
| Tuberculosis in Poultry | 12 | |

Quarantine for brucellosis in cattle in the test and slaughter eradication areas was applied to some 4 000 herds.

Cattle Tail Tags

| | |
|---|---|
| New applications by occupiers | 4 531 |
| Transfers by occupiers | 1 752 |
| Applications by non-occupiers | 160 |
| Applications for exemption | 73 |

Prosecutions under the Stock Disease Act:

| | |
|---|---|
| Total | 97 |
| relating to tail tagging | 49 |
| lice in sheep | 34 |
| footrot in sheep | 1 |
| border crossing | 5 |
| swill feeding of pigs | 5 |
| illegal movement | 1 |
| quarantine | 2 |

(See also section 4.7 Cattle Tick and Tick Fever Control)

*Stock Foods and Medicines Act*

Registration of stock medicines by the Stock Medicines Board: 1 400 re-registrations, 173 new preparations, 362 outstanding, 25 refused and 255 applications deferred.

Registrations of stock foods numbered 1 298 and Inspectors submitted 293 samples for analysis.

| | |
|---|---|
| Prosecutions | 1 |

*Swine Branding Act*

There were 1 184 swine brands allotted and transferred and 47 inspections and 50 pig sales attended.

| | |
|---|---|
| Prosecutions for failure to brand | 5 |

*Swine Compensation Act*

Compensation was paid for 27 pig carcasses condemned during meat inspection.

Diseases on which claims were paid follow:

| Disease | Claims | Carcasses |
|---|---|---|
| Tuberculosis | 2 | 3 |
| Septicaemia | 20 | 24 |

*Veterinary Surgeons Act*

The Veterinary Surgeons Board approved the registration of 1 176 veterinary surgeons. The Veterinary Investigations Committee investigated 18 new complaints for professional misconduct of which 15 were dismissed.

*Quarantine Act 1908-73 (Commonwealth)*

On behalf of the Commonwealth Government the New South Wales Department of Agriculture administered sections of this Act relating to the importation of plants and animals and their products. These activities are shown below.

| Prosecutions | Plant | Animal |
|---|---|---|
| under Quarantine Act (Commonwealth) | 15 | 3 |
| Customs Act (Commonwealth) | 30 | 29 |
| Both Acts | 29 | 29 |
| Quarantine | | |
| Fees collected ($) | 670 869 | 68 499 |
| Passenger clearance — | | |
| By sea, vessels met | 141 | 141 |
| passenger arrivals | 85 433 | 85 433 |
| quarantine interceptions | 1 290 | 2 185 |
| By air, flights met | 8 640 | 8 640 |
| passenger arrivals | 1 103 919 | 1 103 919 |
| quarantine interceptions | 64 749 | 60 280 |
| Parcels post | | |
| Parcels examined | 17 045 | 5 880 |
| Parcels needing quarantine action | 3 049 | 785 |
| *Plant Quarantine* | | |
| Import permits issued | | 42 868 |
| Cargo — | | |
| General | | |
| vessels attended | | 1 258 |
| seed sampled for examination | | 451 |
| vehicles steam cleaned | | 1 679 |
| Containerised cargo — | | |
| Vessels plying Sydney port | | 173 |
| Containers discharged | | 121 308 |
| Action on containers — | | |
| FCL's immediate delivery | | 71 390 |
| FCL's and LCL's depot inspection | | 47 717 |
| FCL's country inspection | | 1 119 |
| FCL's city approved premises | | 1 082 |
| FCL follow-up inspections | | 2 235 |
| revealing infringements | | 290 |
| International terminal (tonnes) | | 43 000 |
| Richmond terminal (tonnes) | | 6 347 |
| Timber imported — ($m^3$) | | 403 039 |
| quarantine treatment ($m^3$) | | 6 585 |
| Approved premises for processing | | 139 |
| Major items processed, peanuts (tonnes) | | 2 501 |
| soybean (tonnes) | | 10 000 |
| Personal effects (consignments) | | 3 393 |
| quarantine treatment (consignments) | | 513 |
| Nursery stock — | | |
| Total imports (items) | | 23 527 |
| Ornamentals to approved quarantine houses | | 19 896 |
| Plant quarantine station | | 3 631 |
| being Seeds for Department and Universities | | 706 |
| Seeds for private imports | | 10 |
| Fruit trees for Department | | 89 |
| Plants for private importers | | 2 826 |
| Pest Interceptions | | 1 242 |
| Giant African snail *Achatina fulica* (occasions) | | 11 |
| Khapra beetle *Trogoderma granarium* | | 13 |
| Carpenter ants *Camponotus pennsylvanicus* | | 9 |

*Animal Quarantine*

| | |
|---|---|
| Animal imports | |
| Permits issued | 1 918 |
| Animals landed | |
| Domestic livestock | 1 918 |
| Animal pets | 1 426 |
| Aquarium fish | 3 961 341 |
| Others | 5 342 |
| Animals entering quarantine | |
| Dogs and cats | 370 |
| Horses and donkeys | 205 |
| Semen imported | |
| Cattle (doses) | 15 429 |
| Dog (doses) | 60 |
| Animal product imports | |
| Permits issued | 2 358 |
| Main products landed (kg) | |
| Tinned meats | 317 882 |
| Chilled/frozen meat | 1 152 522 |
| Cheese | 4 724 879 |
| Fish products | 3 508 745 |
| Wool | 1 139 778 |
| Fish meal | 901 518 |
| Stock feed | 20 375 359 |
| Ships' pets | |
| Animals bonded | 381 |
| Fish bonded | 4 121 |

*Animal Exports*

| | |
|---|---|
| Health certificates issued | 2 236 |
| Main exports | |
| Domestic livestock | 45 795 |
| Animal pets | 2 768 |
| Birds and poultry | 1 452 |
| Day-old chickens | 505 646 |
| Hatching eggs | 142 283 |
| Others | 1 162 |

*Commerce (Trade Descriptions) Act (Commonwealth)*

Export Regulations: The items exported under these regulations were inspected and health certificates endorsed with treatments supervised for importing.

| | Inspected | Rejected |
|---|---|---|
| ● Grains | | |
| Ships surveyed for grain export | 157 | 67 |
| Wheat (tonnes) | 3 741 083 | 7 887 |
| Sorghum (tonnes) | 35 960 | Nil |
| Barley (tonnes) | 27 812 | Nil |
| Flour (tonnes) | 53 716 | 795 |

This includes 357 containers inspected and loaded in country centres.

● Fresh Fruit and Vegetables

Total packages submitted for inspection: apples 81 242; pears 78 622; citrus 62 269; stone fruit 21 176; grapes 28 703; tomatoes 16 073; strawberries 5 999; potatoes 30 269; onions 88 035; garlic 437; other fruits 41 370; other vegetables 19 077.

Total packaging rejected from export lines due to breakdown, blemish, etc.: apples 3 060; pears 1 573; citrus 1 188; stone fruit 205; grapes 1 608; potatoes 1 051; onions 1 735 and other fruits 604.

This includes 453 containers inspected and loaded into refrigerated containers in country centres.

## SUMMARY OF LEGISLATIVE ACTIVITIES

The following legislation was undertaken:

*Acts:*

| | |
|---|---|
| Cattle Compensation Act, 1951 | amended |
| Chicken Meat Industry Act, 1977 | enacted |
| Egg Industry Stabilisation Act, 1971 | amended |
| Local Government Act, 1919 | amended |
| Marketing of Primary Products Act, 1927 | amended |
| Meat Industry Act, 1915 | amended |
| Meat Industry Act, 1915 | repealed |
| Meat Industry Act, 1978 | enacted |
| Meat Industry Authority Act, 1970 | repealed |
| Noxious Trades Act, 1902 | amended |
| Pest Destroyers Act, 1945 | repealed |
| Pesticides Act, 1978 | enacted |
| Plant Diseases Act, 1924 | amended |
| Statutory and Other Officers Remuneration Act, 1975 | amended |
| Stock Foods and Medicines Act, 1940 | amended |

*Regulations* pursuant to the following Acts:

| | |
|---|---|
| Agricultural Seeds Act, 1921 | 1 amendment |
| Cattle Compensation Act, 1951 | 1 amendment |
| Horticultural Stock and Nurseries Act, 1969 | 1 amendment |
| Marketing of Primary Products Act, 1927 | 3 amendments |
| Meat Industry Act, 1978 | 1 enactment |
| Meat Industry Authority Act, 1970 | 1 amendment |
| Noxious Insects Act, 1934 | 1 amendment |
| Pastures Protection Act, 1934 | 5 amendments |
| Plant Diseases Act, 1934 | 5 amendments |
| Stock Diseases Act, 1923 | 3 amendments |
| Stock Foods and Medicines Act, 1940 | 1 amendment |
| Veterinary Surgeons Act, 1923 | 2 amendments |

*By-laws* under the following Act:

| | |
|---|---|
| Meat Industry Act, 1915 | 2 amendments |

## DISEASE AND PEST CONTROL — REGULATORY

*Brucellosis and Tuberculosis in Cattle*

The funds available for the National Brucellosis and Tuberculosis Eradication Campaign were significantly increased in 1977/8. Almost $6 million was available including $4.075 million from the Commonwealth and $1.875 million from the State.

*Brucellosis:* Increased funding enabled escalation of the pilot test and slaughter activity initiated in December 1976. Test and slaughter was implemented in 22 pastures protection districts which extend throughout the entire coastal and adjoining tableland areas of the State and involve some 3 000 000 breeding cattle in 40 000 herds.

Thirteen areas were gazetted as "special" to enable restrictions to be applied to entries of cattle from outside areas because of the excellent progress already achieved.

Of the 2 334 208 samples collected from 16 207 herds undergoing test and slaughter activity during 1977/8, only 1.1 per cent recorded positive reactions and the average level at initial testing of these herds approximated 1.4 per cent.

Outlets were found for virtually all of the 28 000 brucella reactors detected during 1977/8 and the average payout for compensation approximated $57 per head.

Laboratory testing increased to 3.8 million in 1977/8 (856 000 in 1976/7) due to an approximate five fold increase in samples which reached 3.2 million in 1977/8.

Vaccination numbers for Strain 19 significantly declined by 134 000 to 455 000 in 1977/8 due to unloading of heifers at an earlier age.

Mini computers were installed at each of the five serology laboratories to process and relay data back to the field and on to the Australian Bureau of Animal Health in Canberra.

*Tuberculosis:* New South Wales remains provisionally free of tuberculosis in cattle. However only small gains towards total freedom status were made in 1977/8. Prevalence levels for herds 0.09 per cent and individual cattle 0.0008 per cent (0.09 and 0.002 in 1976/7) showed a reduction in the individual cattle level only.

Field testing approximated 110 000 (146 000 in 1976/7) for 500 reactors (475 in 1976/7), of which 54 per cent revealed lesions on slaughter, again emphasising the economic advantages of the reliance on tail-tag trace-back rather than regular area testing.

*Fruit Fly*

No serious outbreaks occurred in the quarantine areas of the Murrumbidgee and Murray Irrigation Areas, although some flies were trapped at Narrandera, Hay, Hillston and Stanbridge. An outbreak at Deniliquin was brought under control. Heavy infestations occurred in coastal and northern regions of the State, with some activity on the tablelands in the autumn.

The Australian Agricultural Council agreed to an organised fruit fly eradication/suppression programme in South East Australia with co-opreative funding by the Commonwealth and States of N.S.W., Victoria and South Australia. The programme is to be administered by the N.S.W. Department.

*Warehouse Beetle*

A three year eradication programme of warehouse beetle from the rice mills and storages of South Western New South Wales was approved by Standing Committee on Agriculture.

The $312 500 required for year 1 of the programme was funded 50 per cent by the Commonwealth with remainder proportioned among States according to the gross value of cereals produced.

Results obtained in the first year confirmed the efficacy of the prescribed treatments and indicate that eradication will be successfully achieved.

*Bunchy Top Control in Bananas*

The recording of 2 384 bunchy top infected plants was the highest incidence since 1958/59. This was largely due to a flare-up in the South Tweed and Brunswick districts previously lightly infected. Several chronically infected properties were destroyed in the North Brunswick district.

Three major changes were made to the Co-operative Control Scheme currently costing $125 000 annually

— levies will be collected on an area basis instead of production
— inspection of infected properties will be at six weekly intervals instead of three weekly
— Chronically infected properties or parts thereof will be purchased for destruction.

*Beetle Borer of Bananas*

Current control achieved in Northern districts with new pesticides is now equal to control before dieldrin resistance developed. The spread of beetle borer has continued at Coffs Harbour and some areas declared free in 1967 have been re-infested.

*Citrus Leaf Miner*

The southern spread of citrus leaf miner down the New South Wales coast stabilized at Doyalson near Wyong over the past three years. Damage to autumn foliage growth was quite serious in north coast districts.

*Plague Locust Control*

The 1977 spring campaign was an outstanding success. Intensive hatchings occurred throughout the Central West of New South Wales. Some 900 properties were affected by locust hopper bands, some of which were 400 ha in extent. The heaviest infestations occurred in the Canonba and Condobolin Pastures Protection Districts. In these districts hatchings were reported to be the most extensive during the last decade.

Hatchings were first reported early in September and the Department commenced the aerial spraying of bands on 28th September. This spraying was as follows:

| | |
|---|---|
| Ground treatment .. .. .. .. | 51 500 hectares |
| Aerial treatment of bands .. .. .. | 22 000 hectares |
| Aerial treatment of flying swarms .. .. | 40 000 hectares |

The cost of this spraying was $260 500. The Australian Plague Locust Commission also undertook some aerial treatments.

*Vaccine Control*

All avian virus vaccines produced must now be manufactured under a strict set of conditions including the use of specific pathogen-free embryos or tissues and a virus seedlot system. Contamination of vaccines which occurred recently should be prevented by the introduction of these conditions.

Discussions were held with footrot vaccine manufacturers to develop guidelines for the production of footrot vaccines. Agreement was reached on minimal standards of performance for both prophylactic and therapeutic effects to qualify for registration.

*Newcastle Disease*

Following the smuggling of parrots into Australia from which Newcastle disease virus was isolated, a surveillance programme was instituted in the Central Coast of New South Wales. No evidence of infection was found in this State.

## CATTLE TICK AND TICK FEVER CONTROL

Control of cattle tick *(Boophilus microplus)* within the infested area in the northeast of New South Wales is exercised by the Board of Tick Control under the jurisdiction of the Department of Agriculture. The infested country embraces a number of quarantine areas from and within which the movement of stock is controlled.

During 1976/77 52 holdings were found infested and one holding was infected with tick fever out of a total of 6 756 holdings in the Tick Quarantine Areas.

Prospects for releasing Cullendore area from quarantine were destroyed when infestations were found on four holdings during an examination programme.

For the first time since 1974 all holdings in the Tick Quarantine Area were involved with either a dipping or examination programme: 4 381 holdings with 439 071 cattle in the northern part of the area underwent five to nine treatments, all commencing in October, and 2 375 holdings with 268 000 cattle, mainly in the southern part of the area, underwent one to four examinations, commencing in February.

The examination programme enabled an assessment of the cattle tick situation in the southern part of the area, most of which had not been subjected to strategic planned dipping programmes for three years. Thirty five infestations were found of which six were in the one area.

The property eradication programme applied to infestations had to be modified in three areas. In Cullendore, the nature of the climate and the country made adequate mustering impossible. In Casino area modification was necessary in the case of all infestations; for the most part this was done because of drought conditions but in the case of the Jackybulbyn infestation extensive forest areas made adequate mustering impossible.

Over 800 dips in the northern part of the area were charged with Taktic(R) but a few had Promicide(R). Work continued in the southern part of the area to charge sufficient dips with Promicide to ensure that all treatments carried out for the Board's purposes were done in a highly efficacious chemical. These were previously charged with ethion. When completed almost 300 dips will be charged with Promicide.

(R) Registered trade name

Compensation claims involving 3 951 were paid for 61 head of stock which died from acaricide or injuries received during dipping.

Organophosphorus resistance was found in cattle ticks from all 14 infested holdings for which testing was complete. Biarra, Mt Alford, Ridgelands and Mackay resistant strains were detected. The Mackay strain had been suspected for the first time in New South Wales from ticks collected the previous year. Resistance to DDT was found in two samples of cattle tick.

The Laboratory, Board of Tick Control as Lismore, carried 18 219 acaricide and lime estimations and 8 530 hair, pH and mud estimations on dip samples. Analyses on 190 samples were done for residues in addition to analyses for the state wide pesticide residue survey.

Major activities are summarised below:

| Activity | Cattle | Horses | Carcasses |
|---|---|---|---|
| Number of examinations .. .. | 2 259 740 | 31 374 | 732 623 |
| Number of dippings .. .. .. | 2 131 400 | 1 799 | |
| Number of sprayings .. .. .. | 23 521 | 27 531 | |
| Policy examinations .. .. .. | 239 634 | | |
| 10 per cent examinations .. .. | 344 247 | | |
| Stock movement control .. .. | 1 231 526 | 15 887 | |
| Vehicular movement through gates .. .. .. .. | | | 5.7 million vehicles |

*Queensland Border Control*

To prevent cattle ticks from entering New South Wales, control was maintained on the introduction of livestock, plants and some animal products from States where the parasite exists. Inspectors located on the Queensland border supervised the entry from Queensland of 394 355 cattle, 547 042 sheep, 25 905 pigs, 7 882 horses, 14 980 goats and 143 other animals.

## TECHNICAL SERVICES

*Animal Health Diagnostic Services*

The number of specimen consignments submitted for examination at Departmental veterinary laboratories increased by 158 per cent over the previous year to 65 997 in 1977/8. This included 47 818 consignments associated with the National Brucellosis Eradication Campaign which accounted for most of the increase.

The origin and sources of specimens, excluding those for the brucellosis campaign were:

**Specimen Consignments to Departmental Veterinary Laboratories**

| Source | Glenfield | Armidale | Wollongbar | Wagga Wagga | Total |
|---|---|---|---|---|---|
| Cattle | 5 788 | 744 | 862 | 1 584 | 9 008 |
| Sheep | 2 224 | 332 | — | 1 044 | 3 600 |
| Pigs | 513 | 136 | 266 | 267 | 1 182 |
| Poultry | 920 | 176 | 83 | 84 | 1 263 |
| Other animals | 1 133 | 719 | 798 | 286 | 2 936 |
| Other specimens | 132 | 15 | 40 | 3 | 190 |
| Private practitioners | 3 960 | 884 | 718 | 1 000 | 6 562 |
| Veterinary inspectors | 2 072 | 533 | 550 | 820 | 3 975 |
| Departmental officers | 4 553 | 542 | 771 | 1 386 | 7 252 |
| Others | 125 | 193 | 10 | 62 | 390 |
| Total | 10 710 | 2 152 | 2 049 | 3 268 | 18 179 |

*Plant Health Diagnostic Services*

The Biology Branch at the Biological and Chemical Research Institute, Rydalmere, processed the following:

| | | |
|---|---|---|
| Plant specimens examined for disease | | 1 043 |
| Samples examined for parasitic nematodes | | 1 251 |
| Mushroom culture and disease control enquiries | | 795 |
| Specimens added to the herbarium | over | 2 000 |

The Entomology Branch at the Biological and Chemical Research Institute made 1 141 identifications of insect and mite pest problems of plants and plant products.

*Chemistry Laboratory Services*

The Chemistry Branch at the Biological and Chemical Research Institute undertook the following:

| Service | Number of samples | Number of analyses |
|---|---|---|
| Plant analysis — inorganic | 10 112 | 59 535 |
| Soil analysis — inorganic | 11 970 | 70 321 |
| Water analysis — inorganic | 879 | 6 233 |
| Fertilizer analysis | 118 | |
| Pesticide analysis | 1 002 | |
| Biochemical assays | 1 285 | |
| Cereal quality evaluations | 2 000 | |
| Nutritional diagnoses/recommendations | 12 079 | |

*Botanical Services*

The Royal Botanic Gardens and National Herbarium provided the following services:

| | |
|---|---|
| Plant specimens identified | 9 514 |
| Enquiries answered | 4 017 |
| Herbarium specimens sent on exchange | 3 200 |
| Herbarium specimens received on exchange | 7 136 |

*Certified Seed Production*

Some 724 t of certified seed was produced under the supervision principally of seed production officers. Certified seed included:

subterranean clover 129 tonnes, annual medics 22, Lupins 133, Hunter River lucerne 38, other lucernes 1, white clover 18, Kangaroo Valley ryegrass 38, phalaris 8, cocksfoot 24, tall fescue 7, kikuyu 9 and maize 296.

Post control testing was conducted at Temora Agricultural Research Station to check on the varietal identity and purity of certified seed lines.

*Registered Cereal Seed*

There were three major changes in the registered cereal seed scheme:

- Ten foundation seed growers were selected to share the responsibility with Temora Agricultural Research Station of providing high quality foundation seed to the registered seed growers. They produced 2 249 bags of commercial foundation seed.
- Objective field and seed standards were introduced to ensure that registered cereal seed is of high quality.
- New registered seed growers must now demonstrate their ability to meet these standards.

*Seed Testing*

The Department's Seeds Laboratory tested 8 490 seed samples from the following sources:

| | |
|---|---|
| Quarantine (Export and Import) | 988 |
| Regulatory (taken by Departmental Inspectors) | 254 |
| Certified — pasture | 149 |
| — maize | 193 |
| — lupin | 23 |
| Industry — miscellaneous | 1 130 |
| — rice | 35 |
| Departmental (including registered cereal seed) | 1 997 |
| Other Departments | 124 |
| Seed for identification | 69 |
| Australian wheat collection | 3 528 |

*Dairy Product Quality Assurance*

The Department took 1 406 samples of New South Wales, interstate and imported dairy products, which were subjected to 5 237 chemical and 4 762 microbiological tests.

A total of 575 586 boxes of butter and 6 578 boxes of cheese was graded as shown below:

| Source | Butter (25 kg) | Cheese (19 kg) |
|---|---|---|
| N.S.W. | 97 722 | 6 124 |
| Victoria | 434 968 | 21 |
| Tasmania | 42 896 | 236 |
| South Australia | — | 152 |
| Queensland | — | 45 |

The quality of dairy products was generally satisfactory; however problems were experienced with unsalted butter manufactured in Victoria.

*Livestock Recording Services*

The Dairy Herd Recording Service during 1976/7 recorded 821 farms. The cows recorded under the Official and Group Schemes were 13 897 and 59 077 respectively.

The Department also operated

- A Fleece Measurement Service based on Trangie Agricultural Research Station which processed 8 161 wool samples from 66 studs.
- A corrected weaning weight service for British breed sheep studs.
- An on-farm pig performance recording scheme which become operative following the acquisition of ultrasonic backfat measuring equipment.

*Sheep Fertility Service*

This service operated from Wagga and undertook 84 property visits.

*Drought Relief*

The serious drought experienced during the year peaked in January/February when 44 of the State's 59 Pastures Protection Districts were declared drought stricken. The Department administered the following drought relief schemes: road freight concessions, water cartage and cattle slaughter compensation.

After serious flooding occurred in all coastal areas of the State in March, road freight concessions, made available for livestock and fodder movements, were administered by the Department.

*Public Watering Places*

The Department spent $148 000 on the maintenance and improvement of public watering places on stock routes in the Western Division. In addition further maintenance work was carried out by Departmental field officers and with rental money.

# EDUCATION

The Department continued its active role in agricultural education through its agricultural college of advanced education at Orange (Orange Agricultural College), and its two certificate colleges: one at Paterson (C. B. Alexander Agricultural College) and the other at Yanco (Yanco Agricultural College).

These colleges provide courses which give the student not only a greater depth of knowledge but also actual experience, both technical and managerial, enabling him/her to reach a high level of competency in practical farm management and decision making.

The administration of the Department's activities in the field of agricultural education is undertaken by the Agricultural Education Secretariat, which was established for this purpose in 1970.

A prime function of the Secretariat is to provide information, both oral and written, to parents and prospective students in regard to courses, and enrolment procedures, at the colleges.

The Department, in association with the Rural Youth Council, provides the Farm Management Certificate Course and the Farm Office Management Course. Both courses are conducted by correspondence through the officers of the Division of Extension Services. Further details on these courses is given on page 51-2 of this report.

During the year, 7 974 students attended classes conducted by the education centre at the Royal Botanic Gardens. A further 1 986 students could not attend similar classes because of prior bookings of the Education Officer. Information was supplied to 2 814 students so that classes could be conducted in the Botanic Gardens without the assistance of the Education Officer. Guided tours were given to three groups of senior citizens during Senior Citizens Week.

Educational displays which complement the plantings in the Gardens are being developed and will be useful for both school groups and the general public.

## STUDENT STATISTICS

Set out hereunder is a table showing:—

(a) students enrolled in 1977,

(b) students enrolled in 1978,

(c) students who sat for the final examinations in 1977, and

(d) students who passed the final examinations in 1977.

| College and Course | Enrolment | | Final Examination | |
|---|---|---|---|---|
| | 1977 | 1978 | Sat | Passed |
| *Orange Agricultural College* | | | | |
| Associate Diploma in Farm Management | | | | |
| Semester I | — | 53 | — | — |
| Semester II | 34 | — | 34 | 27 |
| Semester III | 43 | 30 | 41 | 34 |
| Semester IV | — | 34 | — | — |
| Associate Diploma in Farm Secretarial Studies | | | | |
| Semester I | — | 24 | — | — |
| Semester II | 27 | — | 26 | 25 |
| Semester III | — | 25 | — | — |
| | 104 | 166 | 101 | 86 |
| *C. B. Alexander Agricultural College* | | | | |
| Certificate in Agriculture | 72 | 75 | 69 | 67 |
| Advanced Certificate in Agriculture | 35 | 56 | 34 | 34 |
| | 107 | 131 | 103 | 101 |
| *Yanco Agricultural College* | | | | |
| Certificate in Agriculture | 71 | 60 | 57 | 54 |
| Advanced Certificate in Agriculture | 13 | 6 | 12 | 12 |
| Advanced Certificate in Irrigation | 11 | 16 | 10 | 10 |
| Advanced Certificate in Pastoral Zone Management | 3 | 4 | 3 | 2 |
| | 98 | 86 | 82 | 78 |
| Total 3 Colleges | 309 | 383 | 286 | 265 |

## SHORT TERM SCHOOLS AND COURSES

The undermentioned short term schools and courses were conducted at the colleges during 1977/78:—

| Course | Duration Days | Number Attend | Sponsor |
|---|---|---|---|
| *Orange Agricultural College* | | | |
| Accountants Short Course | 3 | * | M. Boyce and Associates |
| Communication Workshop | 6 | * | Orange Agricultural College |
| Bankers Short Course | 6 | * | Orange Agricultural College |
| Communication Workshop | 4 | * | Orange Agricultural College |
| Communication Workshop | 6 | * | Orange Agricultural College |
| Agricultural Science Teachers Refresher Course | 3 | * | Department of Education, Western Area Region |
| Farm Office Management Short Course | 2 | * | Orange Agricultural College |
| Management Course | 3 | * | Winchombe Carson Ltd. |
| Agricultural Teachers In-service Seminar | 2 | * | Department of Education, Western Area Region |
| Industrial Arts Teachers Seminar | 5 | * | Department of Technical Education |
| Horse Management — Farriery | 2 | * | Orange Agricultural College |
| Horticultural Conference | 5 | * | Orange Agricultural College |
| Horse Management — Farriery | 2 | * | Orange Agricultural College |
| Industrial Relations Course | 6 | * | Central Western Advisory Council |
| Housing Commission Seminar | 2 | * | Housing Commission of N.S.W. |
| Soil Conservation Service Training Workshop | 5 | * | Soil Conservation Service |
| Communication Workshop | 6 | * | Orange Agricultural College |
| Horse Management — Farriery | 2 | * | Orange Agricultural College |
| Overseas Student Training | 8 | * | Orange Agricultural College |
| Parents Weekend | 2 | * | Orange Agricultural College |

* No record kept of numbers attending

*C. B. Alexander Agricultural College*

| | | | |
|---|---|---|---|
| Refresher Course for ex-students on Personnel Management and Marketing | 2 | 20 | C. B. Alexander Agricultural College |
| Refresher Course for ex-students on the Role of Pregnancy Testing in Beef Cattle Management | 2 | 14 | C. B. Alexander Agricultural College |
| Training Course for Assistant Valuers, Valuer-Generals Department | 5 | 22 | Valuer-General's Department |
| Rural Youth Course in Pig Husbandry and Management | 5 | 28 | Department of Agriculture |
| Horse Seminar for Beef Section Staff Department of Agriculture | 4 | 13 | Department of Agriculture |
| Advanced Training Course for Rabbit Inspectors | 3 | 26 | Department of Agriculture and Pastures Protection Board, Maitland |
| Residential Course on Farm Bookkeeping and Animal Husbandry | 4 | 25 | University of Newcastle and C. B. Alexander Agricultural College |
| Communications Workshop | 2 | 10 | National Dairy Processing Industry Training Committee |
| Residential Music Course | 5 | 27 | St. Mary's Band Club |
| Scottish Country Dancing School | 7 | 103 | Australian Scottish Dancing Society |

*Yanco Agricultural College*

| | | | |
|---|---|---|---|
| Irrigation (General) for Orange and Yanco students | 5 | 42 | Orange Agricultural College |
| Irrigation (Land Forming) | 5 | 20 | Yanco Agricultural College |
| Irrigation (Surveying) | 5 | 15 | Yanco Agricultural College |
| Farm Record Keeping for Farmers' Wives | ½ per week 8 weeks | 30 | Yanco Agricultural College |
| Accountancy for Farmers' Wives | ½ per week 8 weeks | 10 | Yanco Agricultural College |
| Sheep Insemination | 5 | 15 | Yanco Agricultural College |
| Sheep Dog Trials | 3 | 30 | N.S.W. Kelpie Breeds Association |
| Rural Youth | 3 | 30 | Rural Youth and Bank of N.S.W. |

# STAFF ESTABLISHMENT AS AT 30th JUNE, 1978

| Location | Professional | | | | General and Ministerial | | | Admin. and Clerical | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Res. | Educ. | Admin. | Total | Res. | Other | Total | | |
| | (1) | (2) | (3) | | (4) | (5) | | (6) | |
| Secretariat | 1 | — | — | 1 | 1 | — | 1 | 4 | 6 |
| Orange | — | 18 | 1 | 19 | — | 30 | 30 | 8 | 57 |
| C. B. Alexander | — | 11 | 1 | 12 | — | 44 | 44 | 5 | 61 |
| Yanco | — | 11 | 1 | 12 | — | 54 | 54 | 6 | 72 |
| Botanic Gardens | — | 1 | — | 1 | — | — | — | — | 1 |
| | 1 | 41 | 3 | 45 | 1 | 128 | 129 | 23 | 197 |

Explanatory notes:—

(1) Professional officer whose time is predominantly occupied on research projects.

(2) Professional officers whose time is predominantly occupied on education.

(3) Professional officers whose time is predominantly occupied on administrative or other activities.

(4) Clerical assistant whose time is predominantly occupied in assisting the research officer.

(5) Other General Division and ministerial staff. Typists, office assistants and clerical assistants are included in General Division figures.

(6) Only accounting machine operators, stenographers, male clerical positions and library officers are included in these figures.

# N.S.W. INSTITUTE OF RURAL STUDIES

The Institute met on four occasions during the year.

The Orana Rural Training Committee has been very active in providing practical courses for primary producers in the region. So successful has the exercise been that the Institute is examining the possible establishment and development of similar training schemes in other regions of the State.

On 17th November, 1977, the Minister approved of the establishment of the Orange Agricultural College Advisory Council, which has been charged with the responsibility of the management of the College's academic programme and the development of courses.

A course outline for an apprenticeship course in dairy farming has been drafted with a view to its establishment by the beginning of 1979, with other sectors of the industry possibly entering into a comprehensive agricultural apprenticeship scheme as soon as practicable thereafter.

# PART B – ADMINISTRATION

## CENTRAL ADMINISTRATION

### DEVELOPMENTS

Head Office of the Department is scheduled to be moved to the new McKell Building, Rawson Place early in 1979.

The Department's safety programme has again proved that the number of work-caused accidents can be reduced by a concerted effort by all staff. The overall reduction in injury frequency and severity gained the Department a rebate of some $500 000 on last year's insurance premium, while the continuation of the reduction has earned a further discount of 20 per cent on the current premium.

Open office planning and barring to STD are still adversely affecting morale, efficiency and productivity of staff at country offices, although there has been some improvement with the provision of separate offices for district agronomists. The effect has been particularly evident at Moree, Bathurst, Orange, Dubbo and Grafton. It is not possible for extension officers to visit many more farmers and fewer farmers are visiting the office. The difficulty in contacting these farmers other than by telephone has seriously affected counselling and provision of information generally.

Mini computers, mainly for use in the Brucellosis Eradication Campaign, have been installed at the Veterinary Research Station, Glenfield and the District Veterinary Laboratories at Armidale, Wagga and Wollongbar. A mini computer has been ordered for installation at the Agricultural Research Centre, Yanco and approval has been given for the installation of a similar unit at the Agricultural Research Centre, Tamworth. These two units will be used for agricultural research.

Data processing terminals are to be installed at the Agricultural Engineering Centre, Glenfield and the Biological and Chemical Research Institute, Rydalmere.

### BRANCHES AND SECTIONS

*Central Secretariat*

Provides secretarial and service assistance for the Minister and Executive, keeps central records, handles general correspondence and that relating to the Royal Botanic Gardens, Government Domain and Centennial Park.

*Staff and Personnel*

Concerned with recruitment, induction and counselling of staff, processing of matters relating to salary, allowances, promotion, leave and the maintenance of salary, leave and other staff records.

*Accounts*

Receives and pays public moneys, keeps financial records, controls purchases and inspects accounts of branches and institutions.

*Legal*

Preparation of legislation, drafting of regulations and proclamations, conduct of prosecutions, preparation of legal documents and legal advisings, registration of veterinary surgeons and licensing of farm produce agents.

*Management Services*

Responsible for office and ancillary accommodation, layout of offices, office housekeeping, office facilities, including furnishings, telephones, telex, machines and aids, forms design and organisation and methods surveys.

*Pesticide and Environmental Matters*

There are two separate units:

(a) the Registrar of Pesticides who performs a technical administrative service in relation to the registration of pesticides under the Pest Destroyers Act, 1945, and associated matters, and

(b) the Director of Pesticides and Environmental Studies who is responsible for the review, development and co-ordination with other Divisions, Branches, Departments and Authorities of research and extension relating to pesticide residues and other environmental problems of concern to the Department.

*Staff Development Section*

Plans, organises and conducts staff training programmes in implementation of the Human Resources Development Scheme laid down by the Public Service Board and deals with all matters involving in-service training of staff.

*Foreign Aid Projects Support Unit*

Administers the Department's involvement in overseas aid projects and training programmes sponsored by the Australian Development Assistance Agency.

## COMMITTEES, COUNCILS AND TRUSTS

*Australian Agricultural Council*

The Council, which comprises principally the Ministers for Primary Industry and Agriculture of the Commonwealth and the States, met three times, at Alice Springs, Adelaide and Sydney. The Sydney meeting (April) was a special one to discuss carcass classification and dairy industry marketing arrangements.

Some of the more important matters dealt with by Council at the two ordinary meetings held in Alice Springs and Adelaide were dairy industry marketing arrangements; beef industry marketing and stabilisation proposals; carcase classification; Bluetongue and the National Beef Recording Scheme.

*Standing Committee on Agriculture*

Five meetings of the Standing Committee, which are attended by delegates from the respective Departments led by the Permanent Head of each Department, were held at Alice Springs, Canberra (twice), Adelaide and Sydney. The meeting held in Canberra and Sydney were special ones, the main topics discussed being dairy industry marketing arrangements; beef prices stabilization; warehouse beetle eradication and the accelerated introduction of a system of beef carcass classification.

Some of the more important matters discussed at the ordinary meetings at Alice Springs and Adelaide were carcass classification; livestock exports; grain infestation; dairy industry marketing arrangements; hen quotas and plant variety rights.

*Farrer Memorial Trust*

The annual and one ordinary meeting of the Trust were held during the period reviewed.

Total funds held by the Trust at 31st December, 1977 amounted to $52 562 which included $44 420 invested in gilt-edged securities, other assets of $485 and cash at bank $5 971. Donations received during the year totalled $5 283. The Auditor-General of New South Wales has certified that an examination of the Trust accounts at 31st December, 1977 was satisfactory.

The 1977 Farrer Memorial Oration was delivered by Dr D. J. McDonald, Regional Director of Research, Agricultural Research Centre, Yanco. Dr McDonald chose the title "Rice and its Adaptation to World Environments" for his address. Once again, the function was organised by the Farrer Memorial Trust in conjunction with the New South Wales Branch of the Australian Institute of Agricultural Science. It took place in The Great Hall of the University of Sydney during the evening of 15th September, 1977 before some 200 people. Many were representatives from rural organisations and ricegrowers from the Murrumbidgee Irrigation Areas. This was an excellent attendance and a pleasing tribute to the work of Dr McDonald.

The 1976 Farrer Memorial Research Scholar, Mr S. N. Spear, continued his studies at the University of Queensland, and made good prorgess with his investigations. The allowance paid under this scholarship was increased during the year by $500 to $4 000 per annum.

*Royal Botanic Gardens and Government Domain Trust*

The Trust met three times and the more important matters discussed included the increasing incidence of vandalism within the Gardens and Domain; unauthorised playing of contact sports by the public within the Government Domain; and staging of the "Art in the Gardens" exhibition along Macquarie Street.

In addition, Trustees approved plans for improved street lighting for the Domain in the vicinity of the Art Gallery of New South Wales and along Hospital Road.

## MARKETING REPORTS AND RELATED SERVICES

*Price Reporting*

The Division of Marketing and Economics continued to collect and disseminate wholesale market information as required under the Marketing of Primary Products Act, 1927.

Reports covering supplies demand, quality, prices and price movements at the Sydney Farm Produce Market, Flemington for fruit, vegetables and cut flowers and the Homebush Livestock Markets and Wagga for cattle, sheep and pigs (both on a per head and weight basis) were compiled each day these markets traded. Prices for grains, butter and cheese, bacon and hams, honey, bran, pollard and eggs are also collected and reported on a weekly basis. The wholesale and retail prices of various stockfeeds are collected and published monthly and wholesale prices of dressed poultry are regularly recorded.

Retail prices of fruit, vegetables, fish and meat, were also collected daily at various retail outlets throughout the metropolitan area.

Daily Wholesale Price Quotations giving detailed daily market information were supplied to the daily press, periodicals, various Federal and State government departments and other bodies.

The widely distributed Weekly Marketing Notes summarizing the week's activities in all the metropolitan markets continued. Also the recording and monthly publication of Cool Storage Statistics covering the quantities of apples and pears held in cool and controlled atmosphere storages throughout New South Wales were continued. The regular New South Wales Production and Marketing Reports for Beef, Fruit, Sheep, Pigs and Vegetables, summarising production and average monthly wholesale prices for recent years are again to be published.

Records of selected arrivals into Sydney of various primary products, from both interstate and intrastate sources, were maintained.

Summaries of the market information supplied by the Division were broadcast daily by the Australian Broadcasting Commission (including regional relays and interstate hook-ups) and by some city and rural commercial radio stations. Reports of the Livestock Market Reporting Service were disseminated by A.A.P. Reuters.

The operation of the Livestock Market Reporting Service commenced in February, 1978 at Wagga and is progressing satisfactorily.

*Crop and Livestock Reporting Service, Crop Reviews and Forecasts*

The Division has transferred responsibility for the regular crop forecasts to the production Divisions. The wheat, oats and barley forecasts will now be undertaken by the Division of Plant Industry and the Division of Horticulture will undertake forecasts for oranges, lemons, mandarins and grapefruit with assistance from the Division of Marketing and Economics.

Publication continued of the monthly Report on Production Trends which included a summary of seasonal conditions and comment on the seasonal progress and production prospects for over 20 of the more important crops grown in New South Wales; also included were details of monthly slaughtering and production figures for cattle, sheep, lambs and pigs as well as production figures for butter, cheese, milk and eggs; wool receivals and sales through brokers' stores were also covered in this monthly report.

Publication also continued of the monthly survey of New South Wales Pastoral Conditions which reported on seasonal conditions, the pasture and feed situation, the condition of stock and the noxious pest problems in over 50 districts of the State.

*Services to Other Departments and Organizations*

This Department provides a comprehensive range of services to other departments and organizations too numerous to be listed individually. The following examples indicate the range of services provided.

Further assistance was given to the Australian Development Assistance Bureau in the conduct of feasibility studies or provision of consultant services in Bangladesh, Indonesia, New Hebrides, Pakistan, Philippines, Seychelles, Sri Lanka and Thailand and the conduct of projects in Bangladesh and Sri Lanka.

Veterinary assistance (a total of 183 services) was provided to livestock on properties administered by the State Departments of Education, Corrective Services, Police, Youth and Community Affairs, the Health Commission and the Dairy Industry Authority. Assistance was also provided to the Universities of Sydney and New England, C.S.I.R.O. and the National Parks and Wildlife Service.

Technical advice and the training for aborigines was provided to the Commonwealth Department of Aboriginal Affairs in connection with the establishment of two piggeries as a welfare project in north western New South Wales.

The State Meat Inspection Service continued to provide a large number (a total of 507) of pathology and anatomy specimens for educational and research institutions including universities, C.S.I.R.O., hospitals, technical colleges, high schools, private companies, R.A.A.F., the Atomic Energy Commission and the Red Cross Blood Bank of N.S.W.

Plant identifications were provided by the Royal Botanic Gardens and National Herbarium to various government and private organisations including Soil Conservation Service, Forestry Commission, National Parks and Wildlife Service, Police Department, Bureau of Customs and universities. Algal identifications were provided to various groups including universities, N.S.W. State Fisheries and the Water Resources Commission. Technical guidance in horicultural and landscape development works were provided to the Cowra Tourist and Development Corporation, Orange and Lismore City Councils and the Public Transport Commission.

The Agricultural Research Centre, Tamworth continued to provide a wheat testing service, while the Australian Wheat Collection again serviced all wheat research groups in Australia.

Advice on statistics and computing was given to various State and Commonwealth departments and institutions.

At the request of Mines Department, a total of 240 properties were inspected in respect of 80 applications to enter under the Mining Act and reports were prepared in respect of 157 loan applications under the Farm Water Supplies Act for the Water Resources Commission.

Other advice and assistance provided included

— to the Department of Local Government, shire and municipal councils on the Argentine Ant Eradication Campaign

— to various authorities on the presence of the Australian Plague Locust

— to grain authorities on insects in grain

— to various authorities on the identification of plant parasitic and other fungi

— to the Department of Youth and Community Affairs through Flood and Bush Fire Relief Committees.

## OVERSEAS CONFERENCES AND STUDY TOURS

| Name and Designation | Country Visited | Purpose |
|---|---|---|
| R. M. Watts, Director-General | U.K.<br>Europe<br>U.S.A.<br>Hong Kong | Discuss use of agricultural chemicals in respect of availability of alternative pesticides and agricultural chemicals to offset problems relating to export of animal and plant produce. |
| Dr R. B. Dun, Deputy Director-General | Russia | Member of Science Exchange Mission under Australian/U.S.S.R. Science Agreement. |
| D. H. Mumford, Chief, Division of Animal Industry | Saudi Arabia | Assess a development project on abattoir/ feedlot complex. |
| A. A. Clemson, Principal Livestock Officer (Apiculture) | Germany<br>Austria<br>Italy<br>Switzerland | Selection of bee breeding stock for importation. |
| Dr P. J. Holst, Livestock Research Officer | U.S.A.<br>Malaysia | Goat research, management and utilization. |
| P. T. Gilchrist, Special Veterinary Officer (Poultry Health) | U.S.A.<br>Holland<br>U.K. | Study poultry processing and avian vaccine manufacture. |

| | | |
|---|---|---|
| Dr C. A. W. Jackson<br>Special Veterinary<br>Research Officer | U.S.A. | Accept the first Bart Repens Memorial Award by the World Veterinary Poultry Association. |
| R. J. T. Hoare,<br>Special Veterinary<br>Research Officer | New Zealand | Guest lecturer in mastitis control and study National Milk Quality Awareness Scheme. |
| Dr D. G. Gard,<br>Special Veterinary<br>Research Officer | U.S.A. | Study virology. |
| R. J. Smith,<br>District Livestock<br>Officer (Beef Cattle) | U.S.A.<br>Canada<br>U.K. | Study livestock marketing. |
| I. H. Simpson,<br>District Livestock<br>Officer (Sheep and Wool) | U.S.A. | Study agricultural extension methods. |
| G. A. Wise,<br>District Veterinary<br>Officer | U.K.<br>Ireland | Escort horses imported by air. |
| G. C. Carter,<br>Veterinary Officer<br>(Quarantine) | U.K. | Escort horses and investigate equine diseases situation. |
| D. E. Weedman,<br>Registrar of Pesticides | Italy | Attended Food and Agricultural Organisation on Pesticide Registration requirements. |
| Mrs K. L. Wilson,<br>Botanist | U.K.<br>France | Classification of plants. |
| Dr D. J. McDonald,<br>Regional Director<br>of Research | Philippines | Attend 1978 International Rice Research Conference. |
| Dr D. J. McDonald,<br>Regional Director<br>of Research | Burma | Participated in Burma Seed Development Project sponsored by World Bank. |
| Dr W. V. Single,<br>Regional Director<br>of Research | India | Attended 5th International Wheat Genetics Symposium. |
| P. J. Garland,<br>Agricultural<br>Mechanisation Officer | U.K.<br>U.S.A.<br>Canada | Study developments in agricultural machinery. |
| F. S. Benecke,<br>Deputy Chief,<br>Extension Services | U.S.A.<br>Canada<br>West Germany | Study organisation and administration of agricultural extension. |
| D. Fardy,<br>Extension Research<br>Officer | Thailand | Advise Thailand Department of Agriculture on monitoring and evaluating an extension service. |
| R. J. Worrall,<br>Research Horticulturist | Ireland<br>U.S.A.<br>U.K.<br>Europe | Attended International Society for Horticultural Science Symposia and studied developments on floriculture and nursery propagation research. |
| K. J. Scott,<br>Senior Research<br>Scientist | New Zealand<br>Taiwan | Study commercial post harvest dipping in New Zealand and attended International Workshop in Taiwan. |
| F. C. Chalker,<br>Principal Horticulturist | U.S.A.<br>Fiji | Study growing techniques for tropical fruits and nuts. |
| R. S. Sproule,<br>Special Horticulturist | U.S.A.<br>U.K.<br>Holland<br>Italy | Asses effectiveness of methods in horticultural extension. |
| R. Sweedman,<br>Principal Horticulturist | New Zealand | Study miscellaneous fruit crops for possible commercial crops in N.S.W. |
| D. G. Dunsmore,<br>Assistant Principal<br>Dairy Officer | New Zealand | Study bacteriological control of food equipment by cleaning processes. |
| K. W. Dawbin,<br>Research Agronomist | Philippines | Attend International Remote Sensing Conference. |
| G. G. Drummond,<br>Research Agronomist | U.S.A. | Study lucerne breeding for aphid resistance. |
| R. I. Johnson,<br>Assistant Principal<br>Agronomist | New Zealand | Attend Energy Conservation in Crop Production Conference. |
| R. D. Freebairn,<br>District Agronomist | U.S.A. | Study crop production particularly relating to establishment of summer crops. |
| A. B. Dale,<br>Special Agronomist | U.S.A.<br>Canada | Study grain sorghum and sunflower production. |
| W. F. Wratten,<br>Research Agronomist | Europe<br>Canada | Attend 5th International Rapeseed Conference and developments in rapeseed breeding. |
| Dr A. N. Smith,<br>Principal Research<br>Scientist | New Zealand | Attend symposium on Microbial Ecology. |
| P. C. Fahy,<br>Senior Plant Pathologist | New Zealand | Attend symposium on Microbial Ecology. |

| | | |
|---|---|---|
| J. Kuiper,<br>Special Plant Pathologist | New Zealand | Attend symposium on Epidemiology and Crop Loss Assessment. |
| Dr J. A. Thompson,<br>Special Bacteriologist | New Zealand | Study legume inoculants and evaluating techniques. |
| Dr I. Holford,<br>Senior Research Scientist | U.S.A. | Research phosphate behaviour in irrigated soils. |
| P. E. Bacon,<br>Chemist | U.S.A. | Study U.S. rice industry. |
| R. H. Read,<br>Senior Chemist | U.K. | Post graduate studies in soil survey technology. |
| I. G. Ferris,<br>Chemist | U.S.A. | Post graduate studies in entomology. |
| G. J. Osborne,<br>Senior Chemist | U.K. | Post graduate studies in soil science. |
| M. Casimer,<br>Director of Entomology | China | Member of Australian Agricultural Mission. |
| W. A. Palmer,<br>Senior Entomologist | U.S.A. | Post graduate studies in stock parasites. |
| P. J. Walters,<br>Entomologist | U.S.A. | Study exotic lucerne aphids. |
| Dr A. D. Clift,<br>Senior Entomologist | France | Attend International Congress on Edible Fungi. |

## STAFF STATISTICS

*Departmental Staff Establishment as at 30th June, 1978*

| | Professional | | | | | General and Ministerial | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Res. | Ext. | Educ. | Admin. | Total | Reg. | Other | Total | Clerical | Total |
| | (1) | (2) | (3) | (4) | | (5) | (6) | | (7) | |
| Central Admin. | — | — | — | 11 | 11 | — | 34 | 34 | 117 | 162 |
| Ext. Services | 3 | 47 | — | 12 | 62 | — | 111 | 111 | 81 | 254 |
| Animal Industry | 93 | 125 | — | 28 | 246 | 1 317 | 200 | 1 517 | 72 | 1 835 |
| Dairying | 12 | 36 | — | 16 | 64 | 1 | 76 | 77 | 10 | 151 |
| Horticulture | 30 | 36 | — | 17 | 83 | 151 | 15 | 166 | 15 | 264 |
| Plant Industry | 84 | 56 | — | 25 | 165 | 25 | 18 | 43 | 15 | 223 |
| B. & C.R.I. | 96 | — | — | 7 | 103 | 1 | 103 | 104 | 10 | 217 |
| Biometrical | 13 | — | — | 2 | 15 | — | 1 | 1 | 6 | 22 |
| Mktg. & Ec. | 35 | — | — | 10 | 45 | — | 19 | 19 | 8 | 72 |
| Res. Services | 6 | 9 | — | 37 | 52 | — | 578 | 578 | 47 | 677 |
| R.B.G. | 12 | — | — | 2 | 14 | — | 154 | 154 | 3 | 171 |
| Ag. Education | 1 | — | 41 | 4 | 46 | — | 129 | 129 | 22 | 197 |
| | 385 | 309 | 41 | 171 | 906 | 1 495 | 1 438 | 2 933 | 406 | 4 245 |

*Explanatory Notes:*

(1) Professional officers whose time is predominantly occupied on research projects and laboratory diagnostic services.

(2) Professional officers whose time is predominantly occupied on extension to farmers.

(3) Professional officers whose time is predominantly occupied on agricultural education.

(4) Professional officers whose time is predominantly occupied on administrative or other activities.

(5) General Division and Ministerial staff whose time is predominantly occupied on regulatory activities.

(6) Other General Division and Ministerial staff. Typists, office assistants and clerical assistants are included in the General Division figures.

(7) Clerical. Only accounting machine operators, stenographers and male clerical positions are included in these figures.

N.B. Trainees and prickly pear casual staff are not included.

*Senior Retirements and Appointments*

*Retirements*

| | |
|---|---|
| J. L. Hager | Secretary |
| C. R. Hood | Deputy Chief, Division of Research Services |
| L. G. Boucher | Acting Deputy Chief, Division of Dairying |

*Appointments*

| | |
|---|---|
| R. E. Jones | Secretary |
| Dr F. R. Higginson | Director of Chemistry |
| P. A. Witschi | Deputy Chief, Division of Research Services |
| J. G. Stone | Principal Officer (Management) |
| B. P. Mullins | Acting Deputy Chief, Division of Dairying |

## MARKETING BOARDS AND POLLS

The Division of Marketing and Economics is responsible for the administration of the Marketing of Primary Products Act and in particular for the conduct of polls arising from that Act.

Marketing Boards in operation at the beginning of the year were the Egg, Lemon, Rice, Tobacco Leaf, Wine Grapes, Central Coast (N.S.W.) Citrus, Grain Sorghum, Barley, Oats, Murray Valley Citrus, Oilseeds, and Yellow Maize Marketing Boards. The Sheep Meats Marketing Board is currently in recess.

*Polls under the Marketing of Primary Products Act*

Eight polls were conducted under the Act during the 1977/78 financial year. Details are as follows:—

(1) The triennial election of three producers' representatives to the Tobacco Leaf Marketing Board was held on 6th July, 1977. The election was contested and 200 producers voted.

(2) A by-election to fill the vacancy for one producers' representative on the Oats Marketing Board was held on 5th August, 1977. The election was contested and 1 367 producers voted.

(3) A by-election to fill the vacancy for one producers' representative on the Rice Marketing Board was scheduled for 16th November, 1977. Only one person nominated and was declared elected unopposed.

(4) The triennial election of five producers' representatives to the Barley Marketing Board was scheduled for 8th December, 1977. Only the five existing producers' representatives on the Board nominated and they were declared elected unopposed.

(5) The triennial election of five producers' representatives to the Wine Grapes Marketing Board (for the Shires of Leeton, Wade, Carrathool and Murrumbidgee) was held on 16th December, 1977. The election was contested and 499 producers voted.

(6) The poll on the question of placing under the control of the Wine Grapes Marketing Board (for the Shires of Leeton, Wade, Carrathool and Murrumbidgee) the wine grapes that were not already under its control in the four Shires was held on 25th January, 1978. The number who voted totalled 257 of which 85 per cent were in favour. The Board now controls all wine grapes produced in the four Shires.

(7) The triennial election of three producers' representatives to the Oats Marketing Board was scheduled for 16th February, 1978. Only three existing producers' representatives on the Board nominated and they were declared elected unopposed.

(8) The triennial election of five producers' representatives to the Lemon Marketing Board was held on 2nd May, 1978. The poll was contested in one electoral district and 86 producers voted. The nominees in the other two districts were declared elected unopposed.

All the polls were conducted by the Division (with the Chief as Returning Officer) except for the triennial elections for the Barley, Oats, and Lemon Marketing Boards which were conducted by the State Electoral Office (with the Electoral Commissioner as the Returning Officer). The Division provided assistance to the State Electoral Office during the running of these three polls.

## DIVISIONAL ADMINISTRATION

*Division of Animal Industry*

(a) *Functions*

The Division is responsible for research, extension and regulatory control of livestock production and health.

Research is conducted into diseases of all classes of commercial livestock and the breeding, nutrition and management of sheep, beef cattle, pigs, poultry, Angora goats and bees, together with nutrition of dairy cattle. Noxious and feral animal research is also undertaken.

Extension is directed at educating stockowners to improve the efficiency of selection reproduction, management and nutrition of sheep, beef cattle, pigs, poultry, Angora goats and bees, including the prevention and control of disease in these species and in dairy cattle. Regulatory control is exercised over scheduled diseases of livestock and bees, the identification of livestock and the control of noxious animals and insects.

The Division is responsible for inspection of meat for local consumption; administration of certain Government drought, bushfire and flood relief schemes; maintenance and improvement of public watering places in the Western Division; and the registration of stock foods and medicines. On behalf of the Australian Government, the Division administers the sections of the Quarantine Act relating to the import and export of animals and the import of animal products.

(b) *Significant Administrative Developments*

● The establishment of a brucellosis unit within the Division of Animal Industry facilitated the administration of the expanding Brucellosis Eradication Campaign. In head office, the unit includes a Director, Brucellosis Eradication Campaign; an Assistant Director; a Veterinary Officer (Tuberculosis and Brucellosis); an Administrative Officer and a Budget Control Officer, the latter being responsible to the Accountant.

In the field four additional Veterinary Officers (Brucellosis) and five additional Senior Cattle Inspectors were appointed to supervise and organise the field activities of some 300 lay blood collectors.

A number of new offices were opened. These included brucellosis administration centres at Tamworth and Goulburn and field headquarters at numerous centres throughout the coastal and adjoining tableland regions of the state as well as accommodation in Pastures Protection Board premises.

● The State Meat Inspection Service continued to increase regional administration by delegated authority through Regional Supervisory Senior Inspectors appointed at Goulburn, Grafton, Gunnedah, Wagga and Sydney. A revised programme of training of newly appointed Meat Inspectors was commenced and a new uniform for State Meat Inspectors was introduced.

*Division of Plant Industry*

(a) *Functions*

The functions of the Division of Plant Industry are mainly in the broad fields of agronomic research and extension. The Division also administers the Agricultural Seeds Act for which it has a small regulator staff and a Seeds Laboratory.

The Division is responsible for research and extension within the whole range of field crops and pastures, fodder conservation, seed production, weed control, irrigation, and remote sensing. Its research covers breeding, physiology, ecology and nutrition of crops and pastures and the ecology of weeds. It also covers the development of new crops and of new practices such as reduced tillage.

The Prickly-pear Destruction Commission which functions within the administration of the Division presents a separate report to Parliament.

*Division of Horticulture*

(a) *Functions*

The Division of Horticulture is concerned with the prevention and control of plant pests and diseases and the production, marketing and export of fruit and vegetables. Its research, extension and regulatory services are largely designed to assist those industries involved in the growing, post-harvest handling and processing of fruit and vegetable crops. However, in respect to the administration of plant quarantine, the full range of agricultural pests and diseases are covered and, with inspections and certification of exports, the Division's responsibilities embrace commodities such as grain as well as horticultural products.

*Research:* Research horticulturists are located at research stations and laboratories on the north coast, central coast, northern tablelands, central tablelands and in the County of Cumberland as well as in the central west, Murrumbidgee and Lower Murray irrigation areas. A comprehensive research programme relating to plant improvement, establishment/management, production/harvesting, storage/disinfestation/product quality and economics is being conducted with respect to fruit, vegetables and, to a lesser degree, ornamental crops.

*Extension:* Extension Horticulturists are located in the major fruit and vegetable production areas of the State with the object of assisting primary producers to obtain the maximum benefit from their resources by adopting improved techniques. Extension Horticulturists are the link between research and commercial practices. They also assist in the prevention and control of plant pests and diseases as well as being responsible for the presentation of statistical information and crop forecasts.

*Regulatory:* Inspectors (Plant Diseases Act) enforce legislation concerned with the prevention and control of plant pests and diseases; the grading, packaging and labelling of fresh fruits/vegetables; the licensing of potato growers, nurserymen and resellers of nursery stock; and maintaining fruit/vegetable quality standards. As agents for the Commonwealth Government, the Export and Import Branch of this Division administers the plant quarantine provisions of the Quarantine Act and regulations relating to the export of fresh fruit, vegetables, plants, seeds, flour, wheat and other grains under the Commerce (Trade Descriptions) Act.

(b) *Significant Administrative Developments*

*Co-ordination of Country Inspection Activities:* A position of Supervising Inspector (Plant Diseases Act) was created at Orange to co-ordinate inspection activities in the four western agricultural regions.

*XXth International Horticultural Congress:* Officers of the Division have been considerably involved in the planning and organisation of the XXth International Horticultural Congress to be held in Sydney in August, 1978. In particular, officers are assisting with the structure of the technical programme, in the preparation for publication of Congress abstracts, and arranging pre- and post- Congress tours.

*Division of Dairying*

(a) *Functions*

The Division of Dairying has three functions: extension, regulatory, and research.

*Extension:* Guiding farmers and manufacturers in —

animal husbandry techniques;

livestock quality and production through herd improvement programmes;

milking shed management and milking machine efficiency;

farm business management;

production of quality dairy products.

*Regulatory:* Responsible for administering the Dairy Industry Act and certain provisions of the Pure Food Act in regard to —

safeguard farmers' interests by ensuring payment for quality and quantity of products supplied to a dairy company;

enforce standards of hygiene at all phases of production from farm to consumer;

examine and certify operators to ensure efficiency in the conduct of their duties; register dairy produce factories;

safeguard consumers' interests by ensuring safety of dairy products; and check efficiency of testers and graders of milk and cream.

*Research:* Carrying out research on the production of new dairy foods, milk harvesting, detergents and sanitisers, herd improvement and dairy cattle nutrition.

(b) *Significant Administrative Developments*

*Amalgamation of Sections Within the Division*

The Butter and Milk Products Sections were amalgamated into a Products section in January, 1978, with one officer taking over the duties and responsibilities previously carried out by two.

*Training of Farmers to Test Their Own Milking Machines*

Following the withdrawal of Commonwealth support for six Dairy Project Officers, a milking management research/extension group was established to consider, among other things, alternatives for improving milking management and the efficiency of "milk harvesting".

One important outcome has been adoption of the concept of training farmers to test their own milking machines.

For this purpose the Division has produced a series of four video cassette training films (at ⅓ the cost of 16 mm film) for use at farmer discussion group meetings and field days.

*Amalgamation of Districts*

On the retirement of the District Dairy Officer, Murwillumbah in September, 1977 the Lismore and Murwillumbah districts were combined under the administration of the District Dairy Officer, Lismore.

*Establishment of Research/Extension Liaison Group*

In addition to the Milking Management Research/Extension Group mentioned above, two other such groups have been formed in the past year viz Dairy Product Group to foster liaison between research and extension personnel on dairy product manufacture and Hygiene Group, covering developments in farm and factory hygiene methods.

*Division of Research Services*

(a) *Functions*

The Division of Research Services fulfils the following functions:—

- Administration and conduct of research
- Research station management
- Architectural services
- Agricultural engineering services

*Administration and Conduct of Research:* The Division of Research Services provides the framework within which the Department's Regional Research Service is conducted. This involves:

- Research co-ordination across Divisions from Head Office by the Chief and the Research Co-ordinator including the administration of industry research grants and liaison with other organisations.
- Research co-ordination across Divisions and Regional research programme development by five regional directors of research in the Regional Research Directorates centred at Wagga, Yanco, Tamworth, Wollongbar and Orange.
- Regional research programmes are conducted by the five regional directors of research and the Director of Research, Trangie.

*Research Station Management:* Research station management is conducted by 19 managers controlling clerical, general and ministerial support staff and providing the physical environment, facilities and property and stock management for the promotion of regional research at each of the Department's 19 regional research centres and research stations.

*Architectural Services:* The Architect Section comprises three architects and support staff responsible for the design, supervision and advice on the Department's building and maintenance programme and service installations. As well, it liaises with the Department of Public Works and the Housing Commission; and provides plans and building advice to other authorities and to farmers.

*Agricultural Engineering Services:* The Agricultural Engineering Section is responsible for:—

- Regionalized farm mechanization extension by nine agricultural mechanization officers to advise farmers on the characteristics, use and maintenance of power units and agricultural machinery and on the development of farm mechanization systems.
- Engineering research by seven agricultural engineers and their support staff at the Agricultural Engineering Centre, Glenfield, to develop prototype farm machinery and farm mechanization systems; and to design and construct equipment and machinery for specific Departmental research projects.

- Engineering services by four technical officers who also advise and assist Departmental officers with respect to the purchase of scientific instruments, farm machinery and motor vehicles.

(b) *Significant Administrative Developments*

Approval was given by the Public Service Board, on 2nd June, 1978 for the creation of a position of Administrative Officer, Division of Research Services, Grade 7, a position of Senior Clerk, Grade 3 and a position of Clerk, Grade 1. These positions have been created subject to the deletion of the position of Assistant Principal Officer (Management), Senior Clerk, Grade 4 and Clerk, Class 'B'.

The Division of Research Services is now responsible for the administration and supervision of all building maintenance at the Veterinary Research Station, Glenfield, Regional Veterinary Laboratories, Wollongbar, Armidale and Wagga and the Dairy Research Unit at Richmond.

*Division of Extension Services*

(a) *Functions*

- Directs and co-ordinates the Department's extension services throughout the State's eight agricultural regions.
- Administers and maintains the Department's regional offices.
- Supports staff with extension methods training and the provision of audio visual aids.
- Provides the publications and information services of the Department. These include editorial services, home gardens enquiries and press liaison.
- Promotes group extension activities and provides organisational help to the Agricultural Bureau of N.S.W.
- Conducts extension/research evaluation.
- Initiates extension/research liaison.
- Administers and provides professional staff for the Rural Youth Organisation.
- Administers the Department's library services.

(b) *Significant Administrative Developments*

The responsibility for administering the Department's library services was transferred from the Agricultural Education Secretariat to the Division of Extension Services.

The eight positions of Regional Clerk have been re-graded from Grade 1 to Grade 2-3.

The Division of Extension Services provides a secretary for the Minister's Rural Advisory Council.

Positions held vacant because of staff ceilings has forced a number of administrative changes upon the Division.

In country areas, the worst affected position are those of female clerical support and a number of positions of Extension Officer. Some offices in the State have no female clerical support at all and are unable to remain open during normal business hours. Because of vacancies of several Extension Officer positions, neither the Rural Youth Organisation nor the Agricultural Bureau is receiving the standard of service to which they are entitled.

Vacancies of an Editorial Officer, a Photographer, an Artist and a Research Liaison Officer have forced a re-appraisal of priorities and work organisation at the head office level of the Division.

*Division of Marketing and Economics*

(a) *Functions*

The Division of Marketing and Economics does research on all aspects of the production, marketing and handling of agricultural products, including development of research and extension methodology in agricultural economics and farm business management; provides advice on commodity prospects, marketing schemes and rural policy generally and, working mainly through other Divisions, provides extension services in agricultural economics and farm business management. The Division also provides specialized liaison and in-service training in agricultural economics and farm business management to both departmental research and extension officers.

The Division publishes a journal, the Review of Marketing and Agricultural Economics; a monthly Commodity Bulletin; and a bulletin series which under the general title of Miscellaneous Bulletin reports a variety of research studies, survey results and data collections. A number of regional economists publish local bulletin series to provide farmers and others with farm management and agricultural economics data.

A complete price reporting service is provided for all produce markets in the Sydney Metropolitan Area and a retail price reporting service operates for meat, fruit and vegetables, and certain other commodities. Crop forecasts and market outlook and commodity information for a number of products are distributed to the media, producers, processors and other Government authorities.

The Division also administers the Marketing of Primary Products Act, 1927, under which a number of primary produce marketing boards are constituted.

Officers of the Division are representatives on a number of State and Commonwealth boards and committees. Under the terms of the Dairy Industry Authority Act, the Division conducts cost-income surveys of all aspects of the dairy industry in New South Wales. Submissions on Rural Industry matters are prepared and presented to the Industries Assistance Commission.

(b) *Significant Administrative Developments*

A review of the Marketing of Primary Products Act, 1927, continued and a draft is in preparation for consideration by the Minister for Primary Industry.

In May a 1-day workshop was held to discuss the Marketing of Primary Products Act prior to revision of the Act. The workshop was attended by members and officers of agricultural produce boards, representatives of the grain industry, grain merchants association, and Departmental officers.

As a first stage in the extension of the livestock market reporting service to country selling centres, an appointment was made of a Market Reporting Officer at Wagga Wagga.

*Biological and Chemical Research Institute*

(a) *Functions*

The Institute consists of three scientific branches. Biology, Chemistry and Entomology and a Secretariat which provides managerial and clerical support.

Biology Branch consists of plant pathologists and legume bacteriologists. Plant pathologists carry out research on disease of plants, diagnose plant diseases and advise officers of other Divisions and primary producers on plant disease control. They advise State and Commonwealth authorities on matters relating to plant quarantine. The Electron Microscope Unit, concerned with virus and mycoplasma disease of plants, also acts as a service unit to other Branches and Divisions of the Department.

Legume bacteriologists carry out research on factors influencing the successful establishment of nodule producing bacteria in the soil and on the plant. They distribute cultures of those bacteria to other research centres and industrial organisations. They advise field officers of the Department and primary producers on the most efficient methods of legume inoculation. The Australian Inoculant Research and Control Service operates a quality control service for commercial legume inoculants available throughout Australia to ensure the maintenance of high nitrogen fixing ability.

The Chemistry Branch is responsible for conducting research, providing analytical services, and giving technical advice on chemical aspects of plant and animal production and related industries in N.S.W. The Branch is organised into seven sections dealing with the specialised areas of cereals, pesticides, phytochemistry, oils and general chemistry, plant nutrition, soils and water, and plant and soil analysis.

Each of these specialist groups conducts research into problems facing agriculture in N.S.W. and, at the same time, provides recommendations and analytical information to the Department's extension officers who advise farmers on their day-to-day problems. Some of these sections have the added responsibility of seeing that products such as pesticides, stockfeeds and medicines, fertilizers and cereals are of proper standard and are safe for both the farmer and the consumer.

The primary function of the Entomology Branch is to conduct research towards improving pest control methods in New South Wales. Other significant functions related to and flowing from the Branch's research are technical and extension services. These involve giving regular advice on pest identification and control to extension officers, primary producers and the general public. In addition, expert technical opinion is provided, as part of the Department's regulatory function, on matters such as insecticide

registration, insecticide residues in meat and produce, insect quarantine, locust and fruit fly control relating to Acts of Parliament, fresh fruit disinfestation procedures, and the handling and export of grain. The Branch also maintains an administrative and advisory role in the Argentine Ant Eradication Campaign, a programme jointly carried out by Local Government and the Department.

(b) *Significant Administrative Developments*

Mr C. R. Wellings transferred to the Agricultural Research Centre, Tamworth, where he will undertake studies on crop loss assessment. This move was foreshadowed in the annual report for 1976/77. Mr Wellings now occupies a position that was previously located at Gosford. The transfer of the position from a horticultural region is in keeping with Biology Branch policy to redress the imbalance in the distribution of staff between the field crops and the horticultural crops.

Mr Wellings will investigate the losses caused by leaf pathogens of cereals in northern New South Wales. Later, as he develops particular expertise in the area of crop loss assessment, he will be asked to investigate the losses caused by diseases on a range of important field crops. This information is essential if the resources of the Branch are to be used to best advantage for the solution of economically important diseases of crops in New South Wales.

Dr D. F. Herridge also transferred to Tamworth after returning from study leave. Dr Herridge, a legume bacteriologist, aims to study the efficiency of nitrogen fixation in a number of grain legume crops. This move is in keeping with Biology Branch policy to shift the emphasis of the plant bacteriologists from studies involving the ecology of legume bacteria, competition between strains of *Rhizobium* and selection of strains for effectiveness to study ways of improving the efficiency of nitrogen fixation in grain legumes. With fossil nitrogen becoming more expensive it is important that agricultural scientists place greater emphasis in this area to ensure that the full potential of the symbiotic association is realised.

Dr Herridge will also initiate a study to investigate energy balances in cereal soils under conventional tillage practices and compare these results with data obtained from fields where stubble retention and reduced tillage practices have been adopted. This proposal is also in keeping with the Department's research on new cultural practices. The study will also complement Biology Branch projects on biological control of cereal root diseases.

The appearance of exotic lucerne aphids in the State during 1977 has required a change in research direction. Initially one Entomologist was diverted from work on vegetable pests to a research programme on aphids, and a second Entomologist was employed in 1978 to assist in these investigations.

*Biometrical Branch*

(a) *Functions*

The Biometrical Branch is responsible for the statistical and mathematical aspects of the Department's research activities. The staff of the Branch consult with research staff at all research stations, advise on proposed plans and methods of analysis and critically examine research projects. They also give seminars and training courses on advances in biometry and computing and carry out biometrical research.

Consultation between biometrician and research worker leads to co-operative research projects in which the biometrician carries out the statistical part and assists in preparing the results for publication.

The Branch is also responsible for scientific computing and the staff prepare programmes and advise on their use.

## ROYAL BOTANIC GARDENS

*Administration and Functions*

The Royal Botanic Gardens and the National Herbarium of New South Wales provide a broad coverage of advisory information and research services in botany and ornamental horticulture.

The Herbarium contains more than 750 000 specimens of native and naturalised flora of Australia, and a considerable collection of world flora. Its research activities include a detailed and comprehensive study of plant groups, which are extended where

appropriate, to wider problems in systematic botany, including investigations of breeding systems and chromosomal studies. In the ecological field, a vegetation survey of New South Wales is the major activity.

The Gardens display a wide variety of plants from throughout the world. And they are undergoing gradual redevelopment to fulfil an enlarged educational function in general botany and biology as well as in the horticultural and landscaping spheres. Associated with the Gardens are the Mt Tomah Annexe for cool-temperate plants, the Domains and Centennial Park, catering for passive recreation, sporting activities, and wildlife conservation. An education service is provided to schools, utilising resources of Gardens and Herbarium. The activities of the Herbarium and Education Section are reported elsewhere.

*General*

Growth of public interest in the Royal Botanic Gardens and associated areas and demand upon the facilities provided continued to increase. But, due to the policy on staff ceilings, considerable difficulty was experienced in maintaining staff strength at a level adequate to cope with the requirements of the public areas. At the end of the year the regular staff complement was 20 per cent below strength.

Large crowds again gathered in the Gardens to watch fireworks displays and activities associated with the second Festival of Sydney. Extensive damage to plantings and widespread vandalism occurred in consequence.

Extensive damage also occurred in other areas of the gardens hit by storms in March. Several valuable mature trees and large shrub species were uprooted. Extremely wet conditions in June caused damage to plantings, resulting in maintenance problems and difficulties in preparing for the visit by delegates to the XXth International Horticultural Congress in August, 1978.

*Improvements*

The Department of Public Works continued with its extensive programme of renovation and improvement to staff facilities, cottages, toilets, glasshouses and other buildings as part of a scheme to reduce maintenance areas. Work began on the replacement of three old steel-framed glasshouses with modern aluminium units.

A further contract was let to complete restoration of the historic Macquarie Wall. Development continued on the new Cactus and Succulent Garden with the construction of timber screens, additional walling and placement of soil fill.

Work began on a further stage of development of education thematic plantings within the middle garden. A bed devoted to economic plants was established with some 103 species of shrubs, perennials and annuals. Several other areas in the Royal Botanic Gardens were replanted with Australian native trees and shrubs, involving the addition of some 60 species. Some 20 advanced trees, up to six metres of height, were transferred from the Mount Tomah Annexe nursery to permanent sites in the Royal Botanic Gardens.

*Plant Production and Glasshouses*

Expansion of the range and quantity of material continued with the propagation and development of local and overseas introductions. However, it became necessary to severely restrict this programme in June 1978 due to lack of staff and facilities. Sufficient material for current replanting and landscape development projects is being provided and maintenance of nursery stock has continued satisfactorily.

Public displays of selected flowering species, ferns and ornamental foliage plants continued in the pyramidal shaped tropical glasshouse which remains a major public attraction.

Several very old glasshouses which, over the years, have been a handicap to the appearance and operation of this important area have been renovated whilst others are in the course of replacement with modern units.

Provision of plants and floral decorations for Parliament House and certain government offices and exhibits continued.

*Landscape Designing and Associated Services*

The Landscape Design Section made inspections and, where appropriate, prepared reports for the Australian Jockey Club's Randwick Racecourse, Orange Municipal Council, The Cowra Tourist Development Association, Lismore Municipal Council, Yarra Bay House and Public Transport Commission. Services available to external institutions remained at a reduced rate due to heavy internal demands for planning and direction of improvements and new developments.

*Mt Tomah Annexe*

Contractors started work on construction of stage two of the new depot complex; and landscaping around the Supervisor's residence and office was completed.

Expansion of the range of plant material being established in the nursery for later planting and development of the Annexe continued with material transferred from the Royal Botanic Gardens nursery and by exchange with other institutions and individual collectors. Nursery facilities have been improved by the construction of a glasshouse for propagation and quarantine purposes.

General site clearing and land preparation continued, but funds of the order required for proper development and staffing of the Annexe continue to be unavailable.

The Premier, The Hon. N.. K. Wran, Q.C., in company with Local Member of Parliament Ald. R. Clough, made a brief visit to the Annexe following representations by local interests for government support to accelerate development of the Annexe.

*Domains*

The Inner and Outer Domains were satisfactorily maintained and further improvements effected. The most significant were the construction of sandstone retaining walls as part of the restoration treatment of Mrs Macquaries Road; commencement of re-alignment and reconstruction of Art Gallery Road and re-grading and re-turfing of areas of parkland affected by construction; construction of a "fun and fitness" track comprising eight obstacles and extending over 1 200 metres; construction of a new toilet and changeroom complex.

The Domain continued to be popular for Sunday public oratory and was used for the formation and disbandment of processions and gatherings of civic and national significance, although to a lesser extent than in previous years.

Lunchtime winter sporting fixtures were again well patronized, with playing fields receiving maximum possible usage. Joggers and other athletes continue to use the area but not without increasing conflict among other users.

*Vice Regal Residences*

Royal Botanic Gardens staff continued to maintain the grounds of Government House and Admiralty House, the Governor's Sydney residence, and to provide interior floral decorations for both buildings.

The Commonwealth reimburses the State for work done by the Department at Admiralty House.

*Centennial Park*

Restoration and improvement of Centennial Park continued as in previous years. However, maintenance standards again suffered due to high staff turnover and forced staffing economies.

Demand for recreation facilities continued to increase beyond the area's capacity to cope, and concerted maintenance attention to these facilities was necessary.

The Hon. N. K. Wran, Premier of New South Wales, and the Hon. D. Day, Minister for Decentralisation, Development and Primary Industries, visited Centennial Park to inspect conditions and to consider improvements.

To reduce through traffic and improve conditions for park users, all entrance gates to Centennial Park, with the exception of the Randwick Gates in Darley Road and the two entrances in Oxford Street, now remain closed to traffic from 4 p.m. to 9 a.m. Monday to Friday. To alleviate problems resulting from the continuing popularity of cycling in the park and the conflict between cyclist and other users, approval was given for the Grand Drive to revert, on a trial basis, to one-way traffic in a clockwise direction, with an outer lane exclusively for cyclists.

Control of illegal parking of vehicles on grassed areas continued to be a problem, particularly when major sporting fixtures and other attractions were held in areas adjacent to the park. Discussions have been held with the Royal Agricultural Society and other bodies to alleviate problems associated with car parking and traffic during the period of the Easter Show.

*Fire Damage* — Extensive fire damage to the main office at Centennial Park occurred on the morning of 7th July, 1977. The office furniture, radio base and switchboard were completely destroyed. On the same morning the Fire Brigade was called to extinguish a fire at the garage of the Superintendent's residence. Both fires were apparently deliberately lit, and the Police Arson Squad were asked to investigate, but with no concrete result.

# APPENDIX I

# ACCOUNTS OF DEPARTMENT OF AGRICULTURE

# FOR THE YEAR 1977/78

The cost of maintaining the Department of Agriculture is met from the Consolidated Revenue Fund, whilst capital expenditure on buildings, equipment and permanent improvements to departmentally owned property is a charge on the General Loan Account.

In addition to these sources of funds, the Department is assisted in financing certain lines of research and development, together with the control of insect pests and animal diseases, by levies on industry and by grants from the Commonwealth, Semi-Government and public and private organisations. Operations in this category are reflected in a large number of accounts within the classification of "Special Deposits" Accounts. The operations on some of the more significant Special Deposits Accounts are detailed later in this report.

## COMPARATIVE STATEMENT OF EXPENDITURE

| Account | 1976/77 $ | 1977/78 $ | Increase (+) $ |
|---|---|---|---|
| Consolidated Revenue Fund | 45 469 067 | 49 549 203 | 4 080 136 + |
| General Loan Account | 1 129 000 | 1 900 000 | 771 000 + |
| Special Deposits Accounts | 18 891 612 | 29 381 278 | 10 489 666 |
| | 65 489 679 | 80 830 481 | 15 340 802 |

## CONSOLIDATED REVENUE FUND EXPENDITURE

Following are details of expenditure from Consolidated Revenue Fund for the previous two years:—

| Division | 1976/77 $ | 1977/78 $ | Increase (+) $ |
|---|---|---|---|
| Central Administration | 8 301 527 | 9 002 180 | 700 653 + |
| Biological and Chemical Research Institute | 2 368 809 | 2 486 165 | 117 356 + |
| Plant Industry | 3 407 760 | 3 833 715 | 425 955 + |
| Horticulture | 3 281 668 | 3 535 931 | 254 263 + |
| Dairying | 1 606 179 | 1 674 875 | 68 696 + |
| Research Services | 6 539 456 | 6 656 443 | 116 987 + |
| Agricultural Colleges | 1 919 718 | 2 113 131 | 193 413 + |
| Animal Industry — | | | |
| Head and District Offices (a) | 10 012 280 | 11 869 185 | 1 856 905 + |
| Queensland Border | 792 758 | 833 524 | 40 766 + |
| Tick Quarantine Areas | 5 496 138 | 5 663 689 | 167 551 + |
| Royal Botanic Gardens | 1 742 774 | 1 880 365 | 137 591 + |
| | 45 469 067 | 49 549 203 | 4 080 136 |

(a) Includes State contribution to
National Bovine Tuberculosis and Brucellosis Eradication Campaign . $1 875 000

The amount provided for the State contribution to Bovine Tuberculosis and Brucellosis campaign was transferred to Special Deposits Account, details of which are given later in this report.

## GENERAL LOAN EXPENDITURE 1977/78

| | $ |
|---|---|
| Condobolin Glasshouse | 67 785 |
| Cowra Agricultural Research Station | |
| Laboratory/Administration Building | 265 789 |
| Glenfield Veterinary Research Station | |
| Administration Building | 2 230 |
| Animal House | 44 100 |
| Griffith Viticultural Research Station | |
| Laboratory/Administration Building | 59 453 |
| Orange Agricultural Research Station | |
| Laboratory/Administration Building | 86 070 |
| Queensland Border | |
| Cottage — Mingoola | 2 680 |
| Richmond Dairy Research Centre | |
| Air-conditioning | 16 366 |
| Rydalmere Biological and Chemical Research Institute | |
| Bulk Store | 15 140 |
| Electron Microscope Building | 27 285 |
| Insecticide Resistance Laboratory | 76 359 |
| Seven Hills Poultry Research Station | |
| Hatchery | 2 886 |
| Tamworth Agricultural Research Station | |
| Laboratory Extensions | 111 180 |
| Staff Amenities Building | 6 722 |
| Trangie Agricultural Research Station | |
| Glasshouse | 32 061 |
| Wagga Agricultural Research Institute | |
| Extensions to Laboratory | 221 733 |
| Wollongbar Agricultural Research Station | |
| Glasshouse | 50 |
| Yanco Agricultural Research Centre | |
| Development | 88 444 |
| Glasshouse | 3 093 |
| Plant and Equipment purchases for the whole Department | 605 746 |
| Road Construction or Renewal | 164 828 |
| | 1 900 000 |

## SPECIAL DEPOSITS ACCOUNTS

Transaction on some of the more significant Special Deposits Accounts during the year are:

### COMMONWEALTH GRANTS FOR STATE SECONDARY SCHOOLS — TECHNICAL TRAINING PROJECTS

These funds are made available by the Commonwealth under the States Grants (Technical Training) Acts. Works under the first triennium (1st July, 1965 to 30th June, 1968) were completed at a total cost of $800 000, and works under the second triennium (1st July, 1968 to 30th June, 1971) were completed at a total cost of $1 227 000. Works under the third triennium (1st July, 1971 to 30th June, 1974) are still in progress, $2 563 710 has been spent to 30th June, 1978.

A summary of receipt and expenditure of funds under the third triennium is shown hereunder:—

| | $ | $ |
|---|---|---|
| Grant received from Commonwealth (including supplementation) | | 2 590 000 |
| Expenditure to 30th June, 1977 | 2 546 486 | |
| Expenditure 1977/78:— | | |
| *C. B. Alexander Agricultural College* | | |
| Accommodation, Lecture Rooms, Library Complex | 13 359 | |
| *Yanco Agricultural College* | | |
| Hydraulics Laboratory | 3 865 | 2 563 710 |
| Balance of funds available to complete third triennium | | 26 290 |

### COMMONWEALTH GRANT FOR COLLEGES OF ADVANCED EDUCATION

Commonwealth legislation provides for grants towards State expenditure on advanced education for courses of instruction which comply with the conditions laid down in the Commonwealth Acts. Until 31st December, 1973, grants were made for the following three purposes:

(1) Financing of major capital projects on a $1 for $1 basis by Commonwealth and State.

(2) Recurrent Expenditure (running costs). The Commonwealth contributed $1 for every $2.85 spent by the State.

(3) Library purposes in the form of a direct grant from the Commonwealth. Commencing on 1st January, 1974, Colleges of Advanced Education have been wholly financed by the Commonwealth Government, there being no further contributions by the State as set out in (1) and (2) above. However, the State was required to contribute ¼th of the 1973/75 triennium Capital Works Programme.

Expenditure on the Advanced Education Programmes is summarised as follows:

| | | | |
|---|---|---|---|
| (1) *Major Capital Projects* | $ | $ | $ |
| *First Triennium* 1st January, 1967 to 31st December, 1969 | | | |
| *Total* Expenditure First Triennium | | | 800 930 |
| *Second Triennium* 1st January, 1970 to 31st December, 1972 | | | |
| *Total* Expenditure Second Triennium | | | 4 418 471 |
| *Third Triennium* 1st January, 1973 to 31st December, 1975 | | | |
| Expenditure to 30th June, 1977 | | 4 502 746 | |
| Expenditure 1977/78 | | | |
| *Hawkesbury Agricultural College* | | | |
| Food Technology Buildings | 3 318 | | |
| Plant Science Building | 5 242 | | |
| Field Services Building | 7 439 | | |
| Electrical Reticulation | 907 | | |
| *Orange Agricultural College* | | | |
| Kitchen, Dining Room and Union | 111 | | |
| Cottages (Seven) | 18 654 | | |
| Ancillary Buildings | 4 878 | | |
| *Wagga Agricultural College* | | | |
| Graham Block Extensions | 142 | | |
| Animal and Plant Science Laboratory | 3 845 | | |
| Engineering Building Extensions | 3 126 | 47 662 | |
| *Total* Third Triennium | | | 4 550 408 |
| *Annual Allocations — 1976* | | | |
| Expenditure to 30th June, 1977 | | | 15 678 |
| *Annual Allocation — 1977* | | | |
| Expenditure to 30th June, 1977 | | 4 152 | |
| Expenditure 1977/78:— | | | |
| *Orange Agricultural College* | | | |
| Purchase of Equipment | | 25 190 | 29 342 |
| *Total* Expenditure to 30th June, 1978 | | | 9 814 829 |
| (2) *Library Grants* | | | |
| *Hawkesbury Agricultural College* | | | |
| Expenditure to 30th June, 1977 | | 50 435 | |
| Expenditure 1977/78 | | NIL | 50 435 |
| *Orange Agricultural College* | | | |
| Expenditure to 30th June, 1977 | | 34 680 | |
| Expenditure 1977/78 | | 10 | 34 690 |
| *Wagga Agricultural College* | | | |
| Expenditure to 30th June, 1977 | | 29 651 | |
| Expenditure 1977/78 | | 7 | 29 658 |
| | | | 114 783 |

## AUSTRALIAN DEVELOPMENT ASSISTANCE BUREAU WORKING ACCOUNT

The finance for Australian Development Assistance Bureau projects is provided by the Bureau. In addition to providing technical expertise and advice, the projects in various countries will be managed by Departmental personnel. Details of the operations of the Special Deposits Account for the assistance are given below for the year ending 30th June, 1978:—

| | | |
|---|---|---|
| Receipts | | $3 108 302.35 |
| *Less Expenditure* | $ | |
| Salaries and Allowances | 202 144.25 | |
| Travelling Expenses | 97 541.08 | |
| Material and Equipment | 1 072 684.89 | |
| Other Expenses | 48 600.64 | |
| Overhead Expenses | 8 650.58 | 1 429 621.44 |
| Balance as at 30th June, 1978 | | $1 678 680.91 |

## SWINE COMPENSATION FUND

Following is a summary of operations on the Swine Compensation Fund for year ending 30th June, 1978.

| | | |
|---|---|---|
| | $ | $ |
| Balance in fund at 1st July, 1977 | | 1 097 460 |
| Receipts — Interest | | 91 200 |
| | | 1 188 660 |
| Payments — Compensation | 1 818 | |
| — Administration Costs | 4 631 | |
| — Research Costs | 4 248 | 10 697 |
| Balance at 30th June, 1978 | | 1 177 963 |

## CATTLE COMPENSATION PAYMENTS 1976/77

| | Number of Claims | | | | Number of Animals | | | | Payments | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | REG 5 | REG 6 | Section 5 (1)(e) | Total | REG 5 | REG 6 | Section 5 (1)(e) | Total | REG 5 $ | REG 6 $ | Section 5 (1)(e) $ | Total $ |
| Brucellosis | 397 | | 58 | 455 | 21 634 | | 971 | 22 605 | 1 241 460 | | 24 627 | 1 265 727 |
| Tuberculosis | 91 | 45 | | 136 | 716 | 54 | | 770 | 54 107 | 4 291 | | 58 398 |
| Tick Fever | 1 | | | 1 | 1 | | | 1 | 54 | | | 54 |
| Trichomoniasis | 1 | | | 1 | 9 | | | 9 | 363 | | | 363 |
| Johnes Disease | 2 | | | 2 | 4 | | | 4 | 313 | | | 313 |
| | 492 | 45 | 58 | 595 | 22 364 | 54 | 971 | 23 389 | 1 296 297 | 4 291 | 24 627 | 1 324 855 |

## CATTLE COMPENSATION FUND

| | | |
|---|---|---|
| Balance as at 1st July, 1977 | | 3 193 962 |
| Receipts — | | |
| Levies | 6 815 | |
| Stamp Duty | 383 567 | |
| Interest | 214 125 | |
| Commonwealth Subsidy—Tuberculosis Reactors | 25 319 | |
| Commonwealth Advance—Brucellosis Campaign | 435 800 | 1 065 626 |
| | | 4 259 588 |
| Payments — | | |
| Compensations — | | |
| National Tuberculosis | 54 107 | |
| National Brucellosis | 1 241 459 | |
| State Brucellosis | 24 267 | |
| State Tuberculosis | 4 291 | |
| State — Other Diseases | 730 | |
| | 1 324 854 | |
| Administration Costs of Department of Agriculture | 33 312 | |
| Payable to Secretaries of Pasture Protection Boards | 8 660 | 1 366 826 |
| Balance in fund at 30th June, 1977 | | 2 892 762 |

The following statistical information is supplied in connection with the compensation payments of $1 324 854.

## ERADICATION OF BOVINE TUBERCULOSIS AND BRUCELLOSIS — WORKING ACCOUNT

| | | | |
|---|---|---|---|
| | $ | $ | $ |
| Balance in fund at 1st July, 1977 | | | 1 728 660 |
| *Income* | | | |
| Contributions by New South Wales | | | 1 875 000 |
| Contributions by Commonwealth | | | 4 074 375 |
| | | | 7 678 035 |
| *Expenditure* | | | |
| Salaries, wages and associated charges | | 3 856 575 | |
| Travelling expenses | | 133 738 | |
| Vehicle running costs | | 90 045 | |
| Printing and requisites | | 18 539 | |
| Postage and telephone | | 41 880 | |
| Freight and cartage | | 41 931 | |
| Equipment and materials | | 674 753 | |
| Costs of tail tags | | 153 240 | |
| Maintenance and Sundries | | 14 495 | |
| Payments to private practitioners | | | |
| for tuberculosis testing | 411 | | |
| for brucellosis testing | 536 100 | 536 511 | |
| Rentals of offices | | 52 097 | |
| Administration costs | | 259 626 | |
| Purchase of plant and motor vehicles | | 692 972 | |
| Land, Buildings and Improvements | | 142 889 | 6 709 291 |
| Balance as at 30th June, 1978 | | | $ 968 744 |

Against the balance of $968 744 quoted above, must be considered firm commitments of $552 785 for Capital items and $903 916 for other items, in total $1 456 701, leaving an actual debit balance of $487 956.

## AUSTRALIAN EXTENSION SERVICES GRANT

| Name of Item or Project | Expenditure 1976/77 | Expenditure 1977/78 |
|---|---|---|
| | $ | $ |
| Agronomy | 363 501 | 447 825 |
| Horticulture | 137 529 | 96 570 |
| Animal Industry | 172 995 | 114 342 |
| Dairying | 103 787 | 46 862 |
| Biometric Services | 24 880 | 35 245 |
| Extension Services | 708 313 | 647 414 |
| Engineering and Machinery Services | 155 515 | 167 354 |
| Agricultural Trainees | (151) | — |
| Publications | 76 043 | 68 792 |
| Library Services | 56 443 | 51 758 |
| (Conference Study Tours — Overseas | 16 090 | 24 778 |
| In-Service Training | 25 012 | 42 399 |
| (Post Graduate Training | NIL | 2 105 |
| Economic and Marketing Services | 277 557 | 261 087 |
| Biological and Chemical Services | 115 809 | 146 127 |
| Buildings and other Major Developments | 59 622 | 41 313 |
| | 2 292 945 | 2 193 971 |

## AUSTRALIAN INNOCULANTS RESEARCH AND CONTROL SERVICE — WORKING ACCOUNT

Following is a statement of receipts and payments for the above account for the year ended 30th June, 1978.

| | $ | $ |
|---|---|---|
| Balance at 1st July, 1977 | | 33 246 |
| Receipts — | | |
| Contributions from — | | |
| New South Wales | 15 950 | |
| Victoria | 6 600 | |
| Queensland | 8 250 | |
| South Australia | 6 600 | |
| Western Australia | 15 950 | |
| Tasmania | 1 650 | 55 000 |
| | | 88 246 |
| Payments — | | |
| Salaries | 46 989 | |
| Operating Expenses | 1 918 | |
| Purchase of Drying Cabinet | 938 | |
| Grant for Rhizobium Newsletter | 1 000 | 50 845 |
| Balance at 30th June, 1978 | | 37 401 |

## NOXIOUS INSECTS DESTRUCTION ACCOUNT

The Noxious Insects Act provides for the striking and collection of a levy under certain specified conditions. Moneys received from the levy are paid into a Special Deposits Account and applied by the Minister for purposes of the Act. Following is a financial statement of the operations of this account during 1977/78 which included costs associated with plague locust as well as spur throated locust.

| | $ | $ |
|---|---|---|
| Balance at 1st July, 1977 | | 175 201 |
| *Receipts* — | | |
| Advance from N.S.W. State Treasury | 300 000 | |
| Levies | 430 095 | 730 095 |
| | | 905 296 |
| *Payments* — | | |
| Contribution to Australian Plague Locust Commission | 336 050 | |
| Equipment purchases | 4 529 | |
| Helicopter and Aircraft Hire | 33 797 | |
| Insecticide purchases | 134 617 | |
| Maintenance/Repair of equipment | 2 200 | |
| Materials and Sundry purchases | 1 579 | |
| Motor Vehicle Running Costs | 11 649 | |
| Salaries | 20 080 | |
| Travelling Expenses | 3 200 | |
| Rentals of premises | 320 | |
| Grasshopper labels | 118 714 | |
| Postal and Telex Expenses | 7 769 | 674 504 |
| Balance at 30th June, 1978 | | 230 792 |

## VETERINARY SURGEONS ACT

This Act provides for the establishment of a Board of Veterinary Surgeons for New South Wales. Fees and penalties collected are paid to the credit of Consolidated Revenue Fund from which the administrative expenses of the boards are met.

Below is a statement of receipts and payments for the year ended 30th June, 1978.

| RECEIPTS | | PAYMENTS | |
|---|---|---|---|
| Roll Fees | $35 068 | *Administration* | |
| Registration Fees | 1 952 | Salaries | $20 011 |
| Restoration Fees | 750 | Members Fees | 1 290 |
| Complaint Fees (Debit) | (70) | Travelling Expenses | 978 |
| Examination Fees | 10 | Printing, Stationery | 3 228 |
| | | Postage and Minor Expenses | 980 |
| | | *Investigating Committee* | |
| | | Chairmans Fees | 391 |
| | | Members travelling | 841 |
| | | *Disciplinary Tribunal* | |
| | | Legal Fees | 100 |
| | | Excess Receipts over Payments | 9 891 |
| | $37 710 | | $37 710 |

## MEAT INSPECTION SERVICE

The Meat Inspection Service is administered by virtue of the Meat Industry Act, which makes provision for a scale of fees. Following is a Statement of receipts and costs associated with this service, for year ended 30th June, 1978.

| | $ | $ |
|---|---|---|
| Receipts from Inspection Fees | | 6 100 197 |
| *Less* | | |
| Salaries, wages and associated items | 4 109 835 | |
| Travelling Expenses and motor vehicle running costs | 265 251 | |
| General Stores, Freight and Cartage | 70 112 | |
| Books, periodicals and printing | 1 822 | |
| Rent, cleaning, phone, electricity and postage | 9 722 | |
| Laundry Expenses | 3 386 | |
| Sundry Expenses | 165 | 4 730 465 |
| Net gain on Meat Inspection Service | | 1 369 732 |

Overhead expenses of $810 729 to cover Administration Charges, Workers Compensation insurance premium, payroll tax and employer's contribution to superannuation funds should also be taken into account.

When this amount is taken into account, the overall net gain on the Meat Inspection Service is $559 003.

## FUND CREATED BY WHEAT MARKETING (BARRING OF CLAIMS) ACT

**Revenue Account for year ended 30th June, 1978**

| | $ | $ |
|---|---|---|
| Interest on Investment and Savings Bank Interest | 6 423 | |
| Return and Repayments of grants unused | 66 | 6 489 |
| Transfer of unutilised revenue to Accumulated Funds | 1 025 | |
| Transfer to Farrer Memorial Trust | 953 | |
| Commitments entered into during the year | 4 511 | 6 489 |

**Balance Sheet at 30th June, 1978**

| LIABILITIES | $ | $ | ASSETS | $ |
|---|---|---|---|---|
| *Accumulated Fund* | | | Investments in Govt. Securities (face value) | 106 000 |
| Balance as at 1st July, 1977 | 108 424 | | Commonwealth Bank Savings | 4 074 |
| Unutilised revenue at 30th June, 1978 | 1 030 | | Accrued Interest | 1 200 |
| Commitments previous years not required | 1 128 | 110 582 | | |
| Commitments at 30th June, 1978 | | 692 | | |
| | | 111 274 | | 111 274 |

## RESEARCH GRANTS 1977/78

*Commonwealth/Industry Funds*

(The cost is shared equally by the producers and the Commonwealth Government)

| | $ |
|---|---|
| Australian Meat Research Committee | 487 799 |
| Wool Research Trust Fund | 404 745 |
| Wheat Industry Research Council | 187 065 |
| Wheat Industry Research Committee | 186 449 |
| Tobacco Industry Trust Account | 60 882 |
| Australian Pig Industry Research Committee | 51 400 |
| Dairying Research Committee | 43 665 |
| Australian Chicken Meat Research Committee | 20 275 |
| Dried Fruits Research Committee | 19 960 |
| A.W.C. Postgraduate Scholarships | 17 850 |
| Poultry Research Advisory Committee | 15 850 |
| | 1 495 940 |

*Industry Sources*

These grants may be supplemented by allocations from the Commonwealth Special Research Grant.

| | 1977/78 $ |
|---|---|
| N.S.W. Rice Industry | 29 700* |
| Special Research Grant | 9 900 |
| N.S.W. Barley Marketing Board | 12 745 |
| N.S.W. Oilseeds Marketing Board | 9 000* |
| Australian Cotton Growers Research Association | 5 380 |
| Mushroom Growers Association | 8 600* |
| Special Research Grant | 5 288 |
| Bean Industry (Seed and processing companies) | 3 000 |
| Flour Millers | 12 500 |
| | 96 113 |

*Other Grants*

| | $ |
|---|---|
| Rural Credits Development Fund (from Reserve Bank and financed by the profits from the Bank's Rural Credits Dept. which provides short term loans to bodies such as Co-operative Associations of primary producers and statutory marketing boards) | 97 770 |
| Australian Biological Resources Study Interim Council | 3 500 |
| McGarvie Smith Institute (financed by Animal Health Industry) | 30 700 |
| Utah Foundation | 11 291 |
| | 143 261 |

* Approximate

## STATEMENT OF RECEIPTS — CONSOLIDATED REVENUE FUND

**Year Ended 30th June, 1978**

| | $ |
|---|---|
| *Receipts for Services Rendered —* | |
| Rents | 111 225 |
| Student Fees | 220 951 |
| Fees — | |
| Witnesses and Jurors | 648 |
| Apiary Registrations | 20 653 |
| Dairy Industry Act | 640 |
| Farm Produce Agents | 530 |
| Fertilizers Act | 5 810 |
| Pest Destroyers Act | 7 360 |
| Poultry Processing Act | 2 103 |
| Stock Brands Registration | 21 583 |
| Stock Foods and Medicines Act | 43 924 |
| Swine Brand Registrations | 1 643 |
| Veterinary Surgeons Act | 37 710 |
| Contribution from Commonwealth — | |
| for administration of plant quarantine | 1 336 432 |
| for administration of animal quarantine | 361 147 |
| for administration of Commerce Act | 356 651 |
| for maintenance of gardens at Admiralty House | 57 161 |
| for export certification of livestock | 63 052 |
| from C.S.I.R.O. for cotton research | 95 703 |
| Fees — | |
| Dipping | 26 538 |
| Inspection — Plant Diseases Act | 26 642 |
| Inspection — Meat Industry Act | 6 100 197 |
| Herd Recording | 292 933 |
| Seed Certification and Testing | 24 193 |
| Miscellaneous | 114 251 |
| Administration Costs — Cattle Compensation Fund | 33 312 |
| Administration Costs — Swine Compensation Fund | 4 631 |
| Commission on premium, collected | 24 579 |
| Miscellaneous receipts for services rendered | 445 963 |
| Total receipts for services rendered | 9 838 165 |
| *General Miscellaneous Receipts —* | |
| Rents, (excluding land, buildings, premises) | 43 643 |
| Fines and Forfeitures (including bond liability) | 2 552 |
| Interest | 686 |
| Sale of Farm Produce | 637 470 |
| Sale of Government Property | 71 539 |
| Repayments to credit of previous years votes | 259 836 |
| Transfer of part balances of Special Deposits Accounts no longer required | 1 286 |
| Miscellaneous Unclassified Receipts | 27 424 |
| Pastures Protection Boards 3% Contribution | 165 565 |
| Employers liability to State Superannuation Fund | 362 745 |
| Sale of Publications | 8 302 |
| Total Miscellaneous Receipts | 1 581 048 |
| Total — ALL RECEIPTS | 11 419 213 |

# APPENDIX II

## PUBLICATIONS 1977/78

Publications are classified as those published by the N.S.W. Department of Agriculture including the *Agricultural Gazette of N.S.W., Review of Marketing and Economics, Dairy Topics, Poultry Notes* and bulletins; contributions to scientific journals; papers presented to technical conferences for which there is some kind of published record; theses present for higher degrees; book and chapters in books; and miscellaneous articles such as those appearing in industry journals.

The appendix does not include the many items published as news and information for press, radio and television, newspaper supplements or other material that can be regarded as largely ephemeral.

## DIVISION OF ANIMAL INDUSTRY

### N.S.W. Department of Agriculture Publications

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Archer, J. F., and Giles, L. R. (1977) Pig Carcase Measurement and Information Service pays dividends. *Agricultural Gazette of N.S.W.* **88** (5): 14

Armstrong, J. P. (1977) Which waterer. *Poultry Notes* July: 9

Ayres, J. F., Kohn, G. D., Southwood, O. R., Osborne, G. J., and Batten, G. D. (1977) Topdressing pastures on wheat-sheep farms in southern New South Wales. *Agricultural Gazette of N.S.W.* **88** (4): 34

Barwick, S. A., and May, T. J. (1977) Stud men see value in production competitions. *Agricultural Gazette of N.S.W.* **88** (6): 28

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Macindoe, R. N. (1978) The way ahead. *Poultry Notes* April: 3

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**ANNEXE**

# REPORT OF

# THE PRICKLY-PEAR DESTRUCTION COMMISSION

# FOR THE YEAR ENDED 30th JUNE, 1978

The Hon. D. Day, M.P.,
Minister for Decentralisation and Development and Minister for Primary Industries.
Sir,

I submit the report of the Prickly-pear Destruction Commission for the year ended 30th June, 1978.

All phases of the Commission's activities were continued during the year. The provisions of the Prickly-pear Act, 1924 were enforced and satisfactory results were achieved. Co-operation and good relationships were maintained with government departments, shire and municipal councils, pastures protection boards, trusts, private organisations and individual land owners.

The Commission is having difficulty in controlling prickly-pear in some areas of the State due to the high costs of eradication measures and the poor state of the rural economy. Prickly-pear is a pest mainly on grazing lands and due to low incomes the owners of these lands do not have the resources to cope with the problem. This has made it necessary to make the utmost use of biological control which is inexpensive compared to spraying operations.

Biological control of prickly-pear with the insects cactoblastis and cochineal has never been very successful in some regions of the State. This is due mainly to climatic conditions. An effort will be made to increase the effectiveness of the insects in these regions. An Entomologist (Ecologist) and a Technical Officer (Scientific) have been appointed to carry out research into the biological control of prickly-pear. The object of the research will be to improve the effectiveness of biological control measures, particularly in areas where insects have not been very successful in the past.

The eradication of Tiger Pear (O. aurantiaca) continues to be the main problem confronting the Commission. This variety of prickly-pear is difficult to eradicate. It is a serious pest along many river systems. The heavy rains last summer in most of the Tiger Pear infested areas caused a prolific growth of this plant. Every effort is being made to keep it under control by spraying with chemicals and encouraging the spread of cochineal insects.

A variety of prickly-pear, Harrisia (Eriocereus martinii), has, since about 1950, become a serious problem in Queensland and is spreading to New South Wales along the border near Boggabilla and Goondiwindi. Harrisia has deep bulbous storage and tuber roots which make it difficult to eradicate with chemicals and the prickly-pear insects have proved ineffective. Harrisia is spread mainly by birds which feed on the fruit and scatter the seeds. Frequent checks are made along the border to destroy any plants that appear in this State.

The Commission assists all owners of prickly-pear infested properties by supplying them chemicals and spraying equipment at greatly reduced prices. Many owners of heavily infested lands were given assistance in the form of free prickly-pear destruction work or free supplies of prickly-pear spray. In addition, assistance was given to government departments, both State and Commonwealth, shire councils, pastures protection boards, trustees of commons, cemeteries, parks and reserves, to destroy prickly-pear on lands under their control. The cost of free work and free prickly-pear spray, supplied to land-holders, government departments and instrumentalities, amounted to $88 610.

Supplies of prickly-pear insects are made available to land owners free of cost and liberated on their properties as required. It is seldom necessary to distribute cactoblastis but cochineal insects often require fresh liberations. Cochineal insects must be systematically hand spread at frequent intervals during the warm months to be successful. It is difficult to get land owners to do sufficient spreading work on their properties.

The destruction of prickly-pear on all unoccupied Crown lands is the responsibility of the Commission. The work was continued throughout the year and the cost to maintain these areas free from prickly-pear was $48 132.

Prickly-pear eradication work, which cost $103 300, was carried out under contract by the Commission for 210 private land owners. Some owners were assisted, regarding payment for the work, by allowing them to pay by instalments over a period of years at a low interest rate.

During the year 16 owners failed to take satisfactory action to destroy prickly-pear on their properties. These landholders were given notices, under the provisions of the Prickly-pear Act, to destroy the prickly-pear. Nine owners have complied with the notices. Action is still in progress regarding seven properties.

The total expenditure by the Commission for the year ended 30th June, 1978 was $1 039 851.39. An increase of $71 445.28 compared to last year.

Sundry debtors were decreased by $7 428.43 during the year. The amount outstanding is $26 710.21, compared to $34 138.64 last year.

There were 49 Prickly-pear Leases covering an area of 22 787 hectares at 30th June, 1978 of which 32 comprising 13 951 hectares were leases in perpetuity.

The Prickly-pear Destruction Commission has a staff of four administrative officers and 61 men on field duties. They comprise 11 Public Service Board appointees and 54 employed under the Prickly-pear Act.

A statement of income and expenditure of the Prickly-pear Destruction Commission for the year ended 30th June, 1978 follows.

V. H. GRAY
Commissioner.

**PRICKLY-PEAR DESTRUCTION COMMISSION**

**Statement of Income and Expenditure as at 30th June, 1978**

| *Credit* | $ | *Debit* | $ |
|---|---|---|---|
| Balance in Fund as at 30/6/1977 | 47 535.68 | Salaries, Wages, Allowances, Workers Compensation and Payroll Tax | 638 633.24 |
| Special Appropriation | 60 000.00 | Salary and Wage Items not subject to Payroll Tax | 33 976.40 |
| Supplementation from Consolidated Revenue | 877 345.00 | Travelling Allowances and Expenses | 42 617.57 |
| Miscellaneous Income | 143 481.32 | Maintenance of Motor Vehicles | 65 677.10 |
| | | Purchase of Motor Vehicles and Caravans | 159 428.69 |
| | | Purchase of Stock, Plant and Minor Equipment | 85 416.36 |
| | | Minor Expenses (Insurances, Freight and Cartage, Buildings and Improvements) | 3 204.97 |
| | | Rents and Rates | 7 468.59 |
| | | Postal and Telephone Charges | 3 428.47 |
| | | | $1 039 851.39 |
| | | Balance in Fund as at 30/6/1978 | 88 510.61 |
| | $1 128 362.00 | | $1 128 362.00 |

Department of Agriculture
New South Wales